KALMIOPSIS

Journal of the Native Plant Society of Oregon

Columbia Phlox (*Phlox douglasii*)

ISSN 1055-419X

Volume 17, 2010

KALMIOPSIS

Journal of the Native Plant Society of Oregon, ©2010

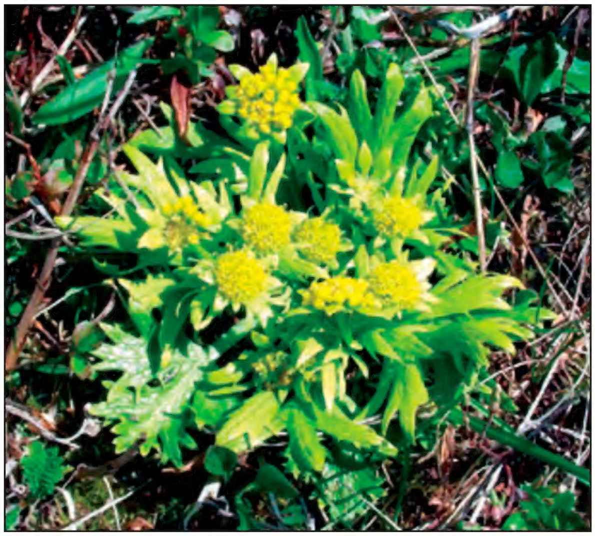
EDITOR: Cindy Roché, PhD

EDITORIAL BOARD:

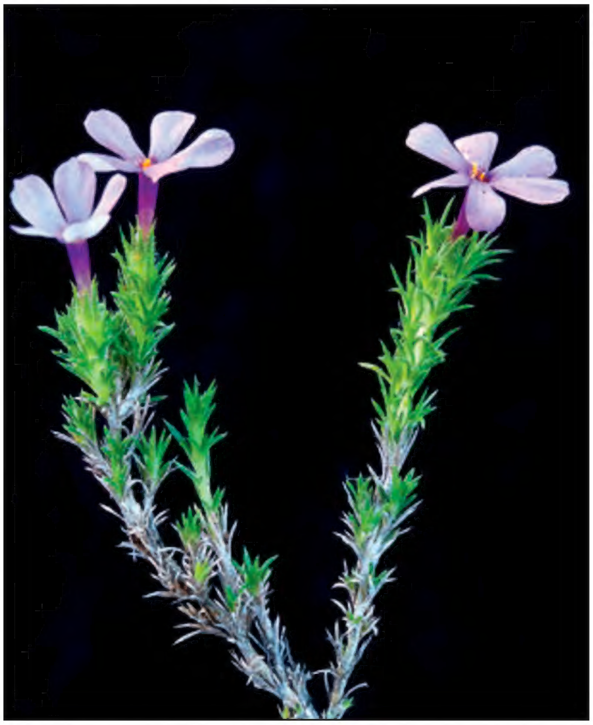
Rhoda M. Love, PhD

Frank A. Lang, PhD

Susan Kephart, PhD



Footsteps-of-Spring, or bear's-foot sanicle (*Sanicula arctopoides*) is a rare biennial of coastal dune prairies. It is one of several dozen native wildflower species that have been reduced or extirpated by introduced beachgrasses; seedlings require open sand to establish. Photo by Kathleen Sayce.



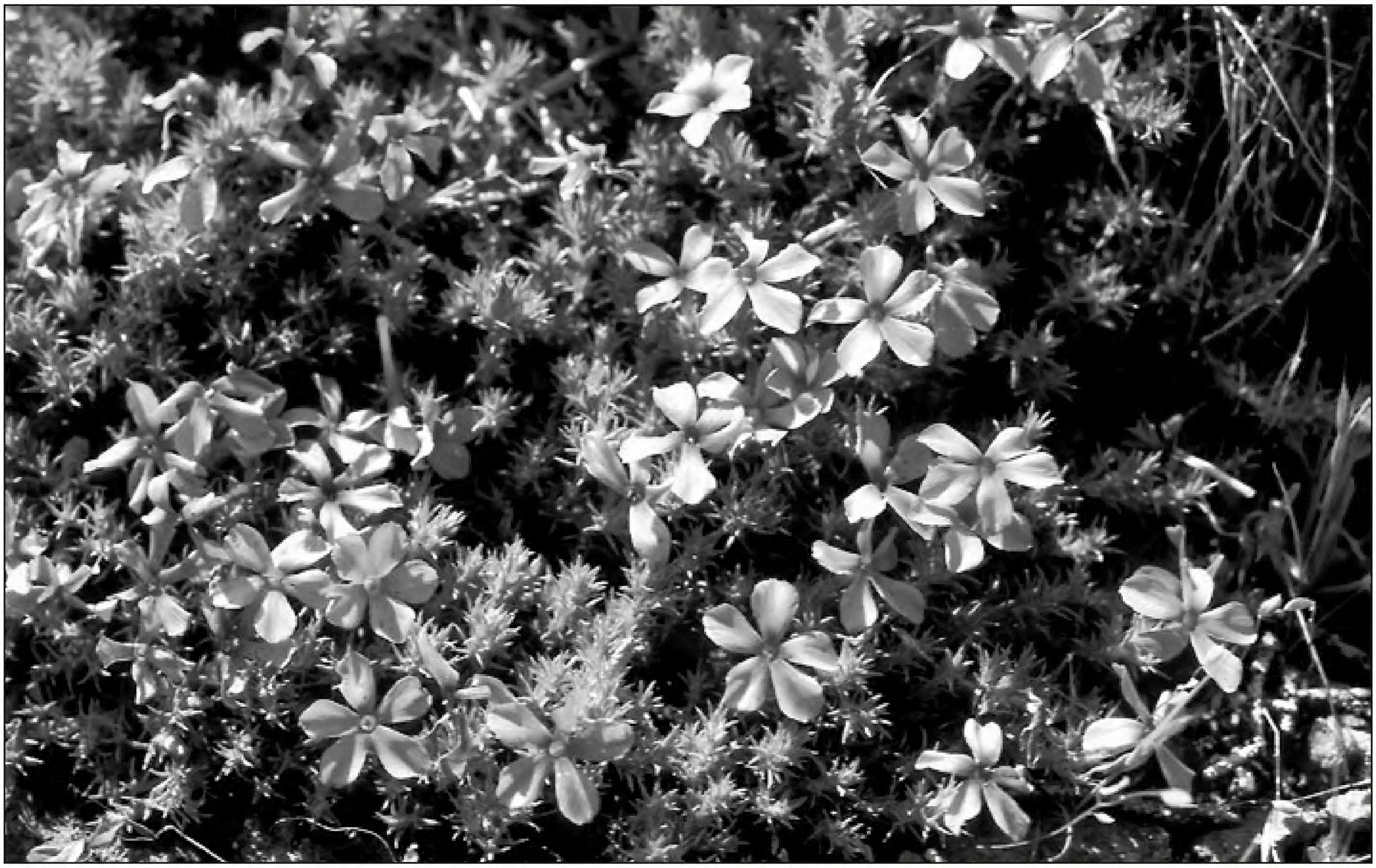
Columbia phlox (*Phlox douglasii*) is a subshrub, producing herbaceous flowering growth that dies back to a branched woody base at the end of each growing season. The stiff, needle-shaped leaves have glandular hairs throughout. Photo by Robert Korfhage.

Cover Photo: Columbia Phlox (*Phlox douglasii*).
Photo by Robert Korfhage, May 2010, at Haystack Reservoir.

KALMIOPSIS: ISSN 1055-419X. Volume 17, 2010. Published annually. Subscription $18 per year.
Native Plant Society of Oregon • General business address: PO Box 902, Eugene, OR 97440-0902 • NPSO Website: http://www.NPSOregon.org

Columbia Phlox (*Phlox douglasii* Hook.)

James H. Locklear
7431 Briarhurst Circle, Lincoln, NE 68506



Phlox douglasii is a subshrub, branching from a woody base with herbaceous growth that dies back to the woody tissue at the end of each growing season. Flowers are borne at the top of the new growth. Photo by James Locklear.

"*Phlox douglasii* is a name covering…a multitude of botanical sins." So wrote Ira Gabrielson in his 1932 classic, *Western American Alpines*, and so I discovered for myself some 70 years later. With grants from the Native Plant Society of Oregon and the North American Rock Garden Society, I waded into a study of the genus *Phlox* in general and *P. douglasii* in particular. While matters of nomenclature can be tedious to work through, the species in question is a prominent wildflower in a number of plant communities in central and eastern Oregon, and a clear picture of its taxonomic identity is important to understanding and describing the ecology of these communities.

The Discovery of Columbia Phlox

English botanist William Jackson Hooker established the name *Phlox douglasii* in his *Flora Boreali-Americana* (1838), in honor of David Douglas, who collected the specimens used to describe the new species. As David Douglas' mentor, Hooker profoundly influenced botanical exploration of North America. Hooker was named Regius Professor of Botany at Glasgow University in 1820, and helped develop the Glasgow Botanic Garden where his path crossed that of a newly hired gardener (David Douglas). Hooker was so impressed with the young Scot that he recommended Douglas to the Royal Horticultural Society of London as a botanical collector (Hooker 1836). Douglas made his first collecting trip under the auspices of the Society in 1823, traveling to the northeastern United States and Canada. In 1824 he set sail for the west coast of North America, arriving at the mouth of the Columbia River in April of 1825. In this vast watershed, Douglas collected seeds and plant specimens for the Society, and in the process, discovered scores of new species that today bear his name (McKelvey 1955).

Douglas collected the first specimens of Columbia phlox in 1826. The type specimen (holotype) of *P. douglasii*, held in the herbarium of the Royal Botanic Gardens, Kew, bears Douglas' handwritten notation, "Limestone rocks of the Columbia and subalpine range of the Blue Mountains…1826." A duplicate specimen at the Museum of Natural History, London, bears the exact same notation. A third Douglas specimen, held by the Gray Herbarium of Harvard University, bears the notation, "very common on the Blue Mountains on Limestone rocks." The Blue

Sir William Jackson Hooker recommended Douglas to the London Horticultural Society as a collector, and named the phlox for him. This portrait of Hooker at age 46 was painted by T. Phillips, engraved by H. Cook, and printed in London by Fisher Son & Co. in 1834. Image courtesy of the Hunt Institute for Botanical Documentation.

Mountains of northeastern Oregon and adjacent southeastern Washington comprise several ranges, including the Wallowa Mountains. Douglas' journal for the years 1823 through 1827, published by the Royal Horticultural Society in 1914, reveals he made two separate excursions into the Oregon portion of the Blue Mountains in June and July of 1826. Douglas most likely encountered Columbia phlox in flower on his first excursion, which commenced on 18 June 1826. Douglas was in the heart of the Blue Mountains on June 20th, when he hiked to the summit of "the highest peak of those untrodden regions," the height of which he estimated at least 9,000 feet above sea level (probably the Wallowas). Between the 20th and 25th of June, Douglas records, "I contented myself by botanizing over the eastern declivities of the mountains," where, at lower elevations, he encountered "several new species of *Phlox*."

Columbia phlox is relatively common at middle elevations in the Blue Mountains, as evidenced by a proposed common name, Blue Mountains phlox (Wherry 1955). In addition to the Blue Mountain collections of phlox, Douglas' list of plants collected in mid-April of 1826 near the mouth of the Spokane River on the Columbia River in present-day Lincoln County in eastern Washington included a small, shrubby *Phlox* "which comes near to *P. setacea* [= *P. subulata*]." Columbia phlox is a common and showy part of the local spring flora in this area, and is the only phlox in eastern Washington that fits Douglas' description.

Artist Sir Daniel Macnee produced this portrait of David Douglas in the fall of 1828, while Douglas was visiting Professor Hooker in Glasgow. Image courtesy of the Hunt Institute for Botanical Documentation.

Untangling Nomenclatural Knots

As one of the first of the cushion-forming phloxes described from western North America, the name *P. douglasii* initially served as catch-all for many later-discovered, superficially similar species, a number of which were treated as varieties or subspecies of *P. douglasii* at some point in their nomenclatural histories. Further confusion was caused by the emergence of the term "Douglasii Hybrids" in horticultural literature in the early 1900s, which was applied to a wide variety of cushion phlox cultivars of probable hybrid origin (see discussion under Horticulture).

Edgar Wherry brought much needed clarity to this situation through a series of taxonomic papers on the western phlox species (1938, 1941, 1942) and his 1955 monograph on the entire genus in which he recognized *P. douglasii* as a distinct species with a distribution centered on the Columbia Plateau in the Pacific Northwest.

The clarity was short-lived. In his treatment of *Phlox* in *Vascular Plants of the Pacific Northwest* (1959), Arthur Cronquist reduced *P. douglasii* to synonymy under *P. caespitosa*. Cronquist described the type of *P. caespitosa* as "a compact plant of the taxon usually known as *P. douglasii*." Since the name *P. caespitosa* was published by Thomas Nuttall (1834) four years prior to Hooker's (1838) publication of *P. douglasii*, Cronquist reasoned, "the latter name [*P. douglasii*]…must subside."

Wherry (1962, 1965) considered this "a serious misunderstanding," calling *P. douglasii* and *P. caespitosa* "about as distinct species as can exist among the Microphloxes." Indeed, Wherry (1955) had placed the two species in independent subsections of the genus – *Douglasianae* and *Caespitosae*. Despite Wherry's protests, Cronquist's view gained the day thanks to the wide circulation of *Vascular Plants of the Pacific Northwest*, and most botanists and ecologists have been using *P. caespitosa* for this species ever since.

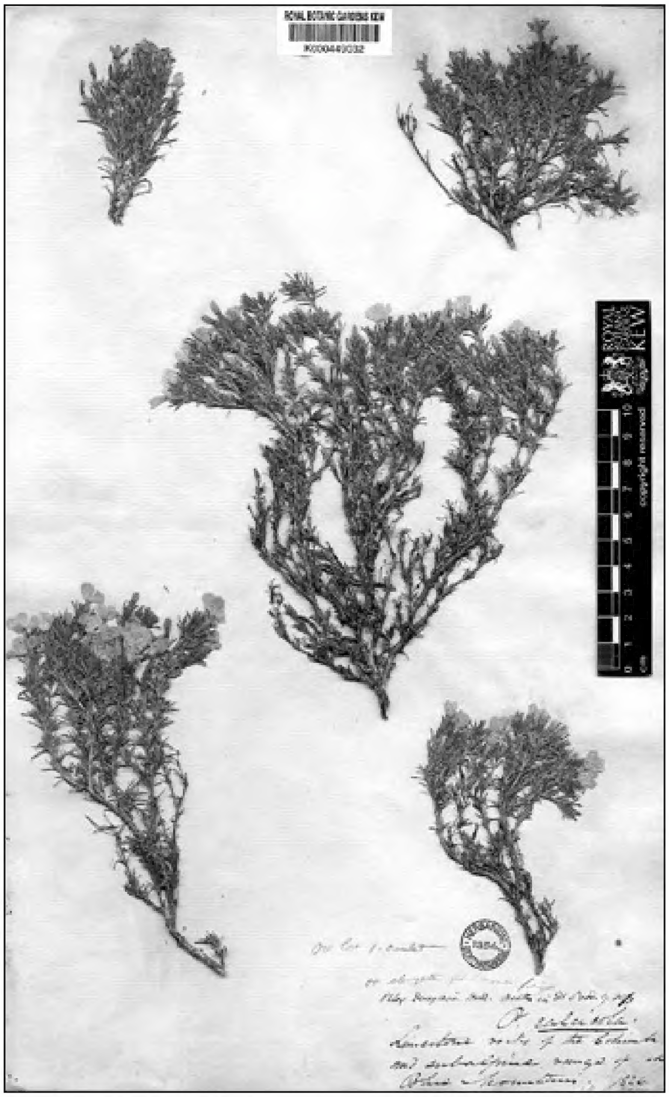
I examined the type material (the original specimens used to describe the species) of *P. douglasii* and *P. caespitosa*, plus I studied both entities in the field (*P. douglasii* in Washington, Oregon, and California; *P. caespitosa* in Montana). This work led me to conclude that the two represent separate species (Locklear 2009). As noted by Wherry (1962, 1965, 1969), the leaves of *P. douglasii* are dark green, slender and needle-shaped (acicular or acerose), and covered by long gland-tipped hairs, while the leaves of *P. caespitosa* are pale green, relatively broad and flat (linear-oblong), thickish, and bear coarse glandless cilia along the margins. The distribution of *P. douglasii* is centered on the Columbia Plateau, while that of *P. caespitosa* is centered in the Northern Rocky Mountains. Accordingly, the name *P. douglasii* has been reinstated (Locklear 2009).

Wherry (1955) recognized *P. douglasii* subsp. *rigida*, which he considered a shorter, more compact expression of Columbia phlox that grows in exposed, xeric habitat. The subspecies is based on *P. rigida*, described by English botanist

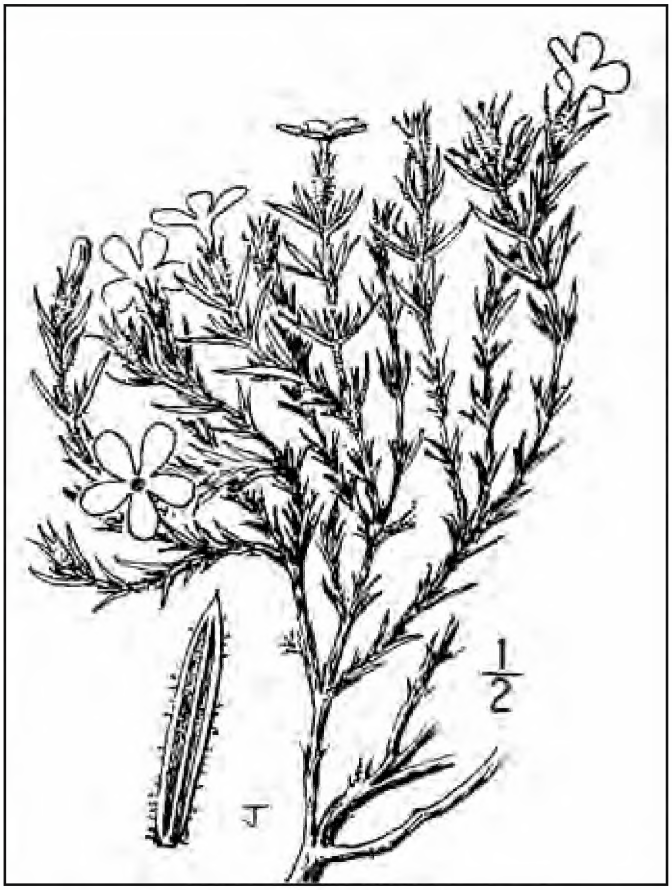
George Bentham in 1845, also from material collected by David Douglas. As presently understood, the subspecies does not appear to warrant recognition and *P. rigida*, a name found in older floristic and ecological literature of Oregon and the Pacific Northwest, should be regarded as a later-published synonym of *P. douglasii*.

Description of Columbia Phlox

Columbia phlox is a subshrub, with herbaceous flowering growth that dies back to woody tissue at the end of each growing season. It is sparingly and diffusely branched, forming open tufts 10-20 cm tall from a woody base, the numerous erect-ascending annual flowering branches 5-15 cm long with about four leaf nodes apparent. The overall growth habit is more strongly condensed in exposed, xeric situations with flowering shoots only 2-4 cm long. The leaves of Columbia phlox are subulate, somewhat acerose, thinnish and dark green, sparsely ciliate and surficially pilose to glabrate with fine gland-tipped hairs, with a maximum length 7-12 mm and width 0.75-1.5 mm. The inflorescence is one- to three-flowered, its herbage copiously glandular-pubescent, with a maximum pedicel length 0.5-6 mm. The calyx is 7.5-11 mm long and united 1/2 to ca. 3/4 its length, the five spreading calyx-lobes linear-subulate with rather prominent midrib and cuspidate apex. The calyx membranes (thin, dry, translucent tissue occurring at the junction of the sepals in the calyx-tube) are flat. The tube of the corolla is 10-14 mm long, glabrous or exceptionally pubescent, and the five spreading corolla-lobes obovate (average dimensions 7.5 by 5 mm). The corolla hue is lavender, pink or white. The style is 4-8 mm long, united to its tip, which is free for about a mm. The flowering season of Columbia phlox is spring to early summer, April-May, into June.



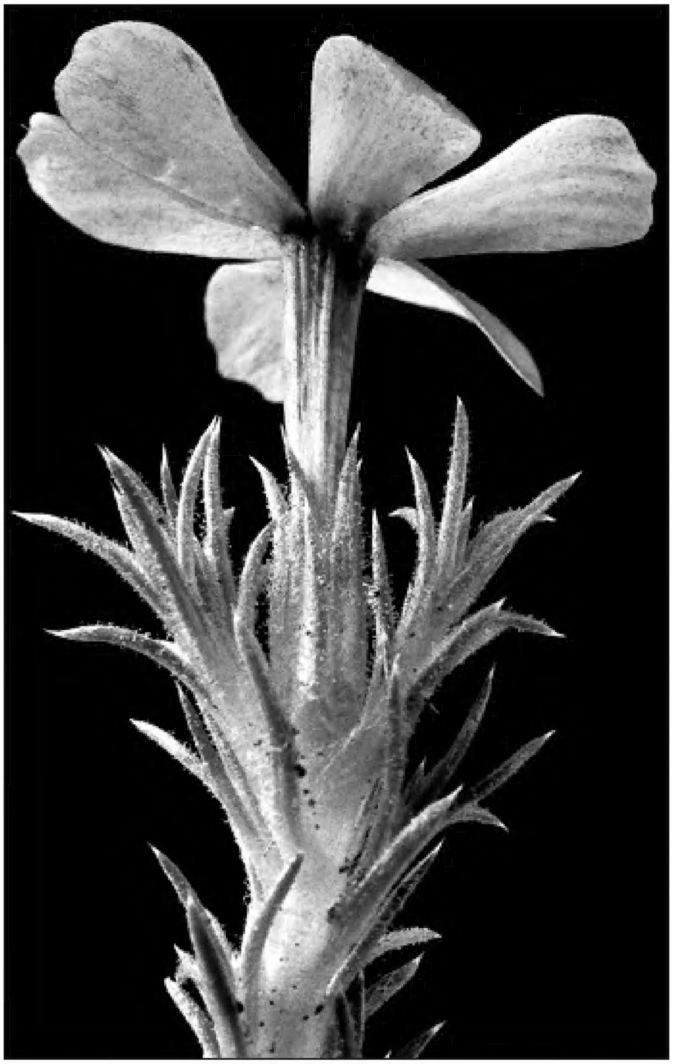
David Douglas collected this specimen of phlox during his first expedition to northwestern North America in 1826 when he was 27; it became the type specimen when Hooker described *Phlox douglasii*. From the collection of the Royal Botanic Gardens, Kew, ©The Board of Trustees of the Royal Botanic Gardens, Kew, reproduced with permission.



Jeanne Russell Janish illustrated *Phlox douglasii* for Herbert Louis Mason's 1951 treatment in Abram's *Illustrated Flora of the Pacific States*.

Cushion-forming Look-a-likes

Columbia phlox is one of a number of cushion-forming phloxes occurring in Oregon that take careful observation to distinguish from each other. These species share a tufted growth habit, with numerous short flowering shoots arising from a woody caudex in discrete clusters to form loose to dense mats, cushions, or mounds. The leaves of these species are small, narrow, and often rigid, and the flowers are solitary or in groups of two to three (up to six) together at the stem-tip. Within its range in Oregon, Columbia phlox is most likely to be confused with *P. austromontana* or *P. diffusa*, two species that share its more open growing, subshrub growth habit. The key on page 8 separates the cushion-forming phlox species of Oregon.



Side view of *Phlox douglasii* showing stiff needle-shaped leaves, calyx lobes, and the glandular hairs. Photo by Robert Korfhage on May 14, 2010, at Haystack Reservoir in Jefferson County.

Distribution and Habitat

As reflected in the common name, the distribution of Columbia phlox is concentrated on the Columbia Plateau, including the Walla Walla and Blue Mountain sections (western Idaho/eastern Oregon/eastern Washington), and the Okanogan Highlands of north-central Washington, as well as the northern Great Basin (northeastern California/southern Oregon/northwest Nevada), including the Harney area of south-central Oregon. Within this region, Columbia phlox is associated with dissected plateaus, foothills, and mountains at elevations ranging from 1,000 to 7,000 feet.

Columbia phlox grows in dry habitats associated with escarpments, bluffs, scablands, ridges, and the upper slopes of rolling terrain. Soils are medium- to coarse-textured, often stony and shallow to bedrock. Parent material is primarily basalt, but Columbia phlox also occurs in association with glacial outwash, pumice and other volcanic substrates, and outwash derived from the volcanic deposits.

In certain parts of its range, Columbia phlox occurs in habitat where the soil profile has a moderately to strongly structured, clayey B-horizon near the surface. The clay impedes water drainage, creating a perched water table with poor aeration in the rooting zone during the winter and spring. Columbia phlox is commonly associated with dwarf sagebrush (*Artemisia arbuscula*) in such habitat. The "*A. arbuscula* scab flats" of the Modoc Plateau of northeastern California, where Columbia phlox is a common species, are described as "virtually lakes in the spring when snow melts" due to the clayey soils (Young *et al.* 1977).

Plant Community Associations

Columbia phlox occurs in conifer woodland, shrubland, shrub-steppe, grassland, and rock outcrop communities. Throughout most of the northern portion of its range on the Columbia Plateau, Columbia phlox is associated with ponderosa pine (*Pinus ponderosa*) woodland and savanna. These open stands of ponderosa pine have an herbaceous layer typically dominated by a single species of xerophytic bunchgrass, either bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), or needle-and-thread (*Hesperostipa comata*), with a rich diversity of forbs. Along with Columbia phlox, typical forbs in these communities include arrowleaf balsamroot (*Balsamorhiza sagittata*), yellowbells (*Fritillaria pudica*), bulbous woodlandstar (*Lithophragma glabrum*), silky lupine (*Lupinus sericeus*), sagebrush buttercup (*Ranunculus glaberrimus*), and Douglas' blue-eyed-grass (*Olsynium douglasii* var. *inflatum*). These communities often border more densely forested areas of higher elevations, as in the Blue Mountains of northeastern Oregon.

In central Oregon and extending into extreme northeastern California, Columbia phlox occurs in western juniper (*Juniperus occidentalis* var. *occidentalis*) woodland. These open stands of western juniper, the most xeric forested community in the Pacific Northwest, occur with a shrub understory of Wyoming big sagebrush (*A. tridentata* subsp. *wyomingensis*), dwarf sagebrush, or antelope bitterbrush (*Purshia tridentata*), along with an herbaceous layer dominated by bluebunch wheatgrass or Idaho fescue. Columbia phlox is often a prominent forb in the herbaceous layer of juniper woodlands, notably in the Ochoco Mountains of central Oregon and the Warner Mountains of northeastern California.

Columbia phlox occurs in several types of shrubland and shrub-steppe on the Columbia Plateau and northern Great Basin. It is strongly associated with dwarf sagebrush in stony, shallow-soil habitat. These communities occur in open scabland, sometimes in a complex mosaic of openings within woodland, shrubland, and grassland communities. In the Hart Mountain National Antelope Refuge in southcentral Oregon, Columbia phlox is associated with extensive stands of dwarf sagebrush on upland flats. It also occurs in shrublands and shrub-steppe dominated by antelope bitterbrush and, less commonly, big sagebrush.

Columbia phlox is a component of grassland communities throughout its range on the Columbia Plateau. It is particularly common in the bunchgrass communities of the watershed of the Spokane River in eastern Washington and adjacent Idaho dominated by Idaho fescue or bluebunch wheatgrass. David Douglas appeared to be writing of Columbia phlox in his journal while in the vicinity of present-day Spokane, Washington, on 10 May 1826, when he noted a "small beautiful species of *Phlox* which I found some time since on the Columbia gave the whole open places a fine effect."

Columbia phlox is often a dominant element in the flora of xeric rock outcrop and scabland and coulee habitat in the Pacific Northwest. It is very common along the rim-rock edges of the basalt plateaus that form the spectacular canyons of the Deschutes and Crooked Rivers in northcentral Oregon. It also is one of the showiest forbs growing on the comparatively recent volcanic substrates in Lava Beds National Monument on the Modoc Plateau in northeastern California. Columbia phlox is a dominant plant in the sparsely vegetated badland habitat derived from eroded volcanic ash and tuff deposits of the John Day and Clarno formations in central Oregon. In northeastern Washington, it occurs on rocky mounds and rock stripes in patterned ground habitat (biscuit and swale).

Interpreting ecological literature in relation to *P. douglasii* is made difficult by the confused nomenclature surrounding this species. Ecological literature pertaining to *P. douglasii* in Oregon includes the following references: Culver 1964 (as *P. diffusa*); Driscoll 1964a, 1964b; Eckert 1957 (as *P. diffusa*); Hall 1967. These names have been repeated where these studies are cited in the important ecological reference, *Natural Vegetation of Oregon and Washington* (Franklin and Dyrness 1988).

Horticulture: Mistaken Paternity

The name *P. douglasii* and the term "Douglasii Hybrids" have been used in European horticulture for decades in connection with the many cushion phlox cultivars that have been selected, named, and introduced into commerce, particularly in England. The association of cultivars with the name *P. douglasii* occurred as early as 1931 in an article on "alpine phlox" in cultivation at the Royal Horticultural Society's garden at Wisley. Some of these cultivars, such 'Crackerjack', are among the most popular and most easily grown cushion phlox in Europe, and several have received the Award of Garden Merit from the Royal Horticultural Society.

Whatever the original source of this material, it was not David Douglas himself, and most likely was not true *P. douglasii*. Careful review Douglas' journal discloses that, while he collected herbarium specimens of a number of phloxes in the Pacific Northwest, the only species from which he actually collected seed was *P. longifolia*. This is in fact the only phlox included on the list of plants introduced by Douglas, as compiled and published by the Royal Horticultural Society in 1914.

Of the many cultivars circulating under the name "Douglasii Hybrids," at least some are suspected to represent hybrids involving spontaneous garden crosses between *P. bifida*, *P. nivalis*, or *P. subulata*, or between one of these eastern mat-forming phloxes and one of the western cushion-forming phloxes. *Phlox diffusa* is the suspected westerner because, like the cultivars in question but unlike most of the western cushion-forming phloxes, it is relatively easy to propagate.

The only reliable report of the cultivation of Columbia phlox is found in Gabrielson's *Western American Alpines* (1932) where it is apparent from his description of its attributes and ecology that he

Another important habitat of *Phlox douglasii* is Columbia plateau low sagebrush (*Artemisia arbuscula*) steppe. Photo by James Locklear at Hart Mountain National Antelope Refuge in Lake County.

Phlox douglasii in a Columbia plateau Western juniper (*Juniper occidentalis*) woodland at The Cove Palisades State Park in Jefferson County. Photo by James Locklear.

was referring to true *P. douglasii*. Gabrielson noted the plant was "in cultivation on the Pacific coast, both in Canada and the United States, and…available in a limited way commercially." Columbia phlox is a showy species with potential not only as a subject for the rock garden but also as a drought-tolerant landscape plant for drier portions of the Pacific Northwest. It should be grown in full sun to light shade in dry, well-drained soil.

Phlox pulvinata in Oregon

Like *P. douglasii*, the identity of another phlox in Oregon has been entangled with the name *P. caespitosa*. The species in question is *P. pulvinata*, the dominant alpine phlox of the northern and central Rocky Mountains. *Phlox pulvinata* occurs in alpine and subalpine communities in the Wallowa range of the Blue Mountains, sometimes in association with exposures of limestone of the Martin Bridge Formation (Cole 1982, Johnson 2004). This taxon was originally described by Wherry (1941) as *P. caespitosa* subsp. *pulvinata*. Subsequent regional treatments of *Phlox*, such as Peck (1941) in *A Manual of the Higher Plants of Oregon* and Mason (1951) in *Illustrated Flora of the Pacific States*, simply reduced this to *P. caespitosa*. Cronquist (1959) elevated it from *P. caespitosa* subsp. *pulvinata* to *P. pulvinata*. Locklear (2009) recently affirmed full species status for *P. pulvinata*.

Acknowledgements

I thank the Native Plant Society of Oregon for providing a grant that assisted with my field research on the genus *Phlox* in the Pacific Northwest. This research was also supported by a grant from the North American Rock Garden Society. Thanks also to the curators and staff of the herbaria of the University of Oregon (ORE) and Oregon State University (OSC) for providing data from herbarium specimen labels.

References

Bentham G. 1845. Polemoniaceae. A. de Candolle, Prodomus systematis naturalis regni vegetabilis 9:302-322.

Cole DN. 1982. Vegetation of two drainages in Eagle Cap Wilderness, Wallowa Mountains, Oregon. USDA Forest Service Research Paper INT-288. Intermountain Forest and Range Station, Ogden, Utah.

Cronquist A. 1959. *Phlox*. Pp. 124-137 *in* Hitchcock CL, Cronquist A, Ownbey M, and Thompson JW, eds., Vascular Plants of the Pacific Northwest. Seattle (WA): University of Washington Press.

Culver RN. 1964. An ecological reconnaissance of the *Artemisia* steppe on the east central Owyhee uplands of Oregon. MS Thesis, Oregon State University.

Douglas D. 1914. Journal kept by David Douglas during his travels in North America, 1823-1827, together with a particular description of thirty-three species of American oaks and eighteen species of *Pinus*, with appendices containing a list of plants introduced by Douglas and an account of his death in 1834. Published under the direction of Royal Horticultural Society, London.

Driscoll RS. 1964a. A relict area in the central Oregon juniper zone. Ecology 45:345-353.

Driscoll RS. 1964b. Vegetation-soil units in the central Oregon juniper zone. USDA Forest Service Research Paper PNW-19, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

Eckert RE, Jr. 1957. Vegetation-soil relationships in some *Artemisia* types in northern Harney and Lake counties, Oregon. PhD Thesis, Oregon State University.

Franklin JF, Dyrness CT. 1988. Natural Vegetation of Oregon and Washington. Corvallis (OR): Oregon State University Press.

Gabrielson IN. 1932. Western American Alpines. New York (NY): The MacMillan Company.

Hall FC. 1967. Vegetation-soil relations as a basis for resource management on the Ochoco National Forest of central Oregon. PhD Thesis, Oregon State University.

Hooker WJ. 1836. A brief memoir of the life of Mr. David Douglas, with extracts from his letters. Companion to the Botanical Magazine 2:79-182.

Hooker WJ. 1838. Flora Boreali-Americana; or, the Botany of the Northern Parts of British North America, volume 2, part 8. London, Paris, and Strasbourg.

Johnson CG, Jr. 2004. Alpine and subalpine vegetation of the Wallowa, Seven Devils and Blue Mountains. USDA Forest Service General Technical Paper R6-NR-ECOL-TP-03-04.

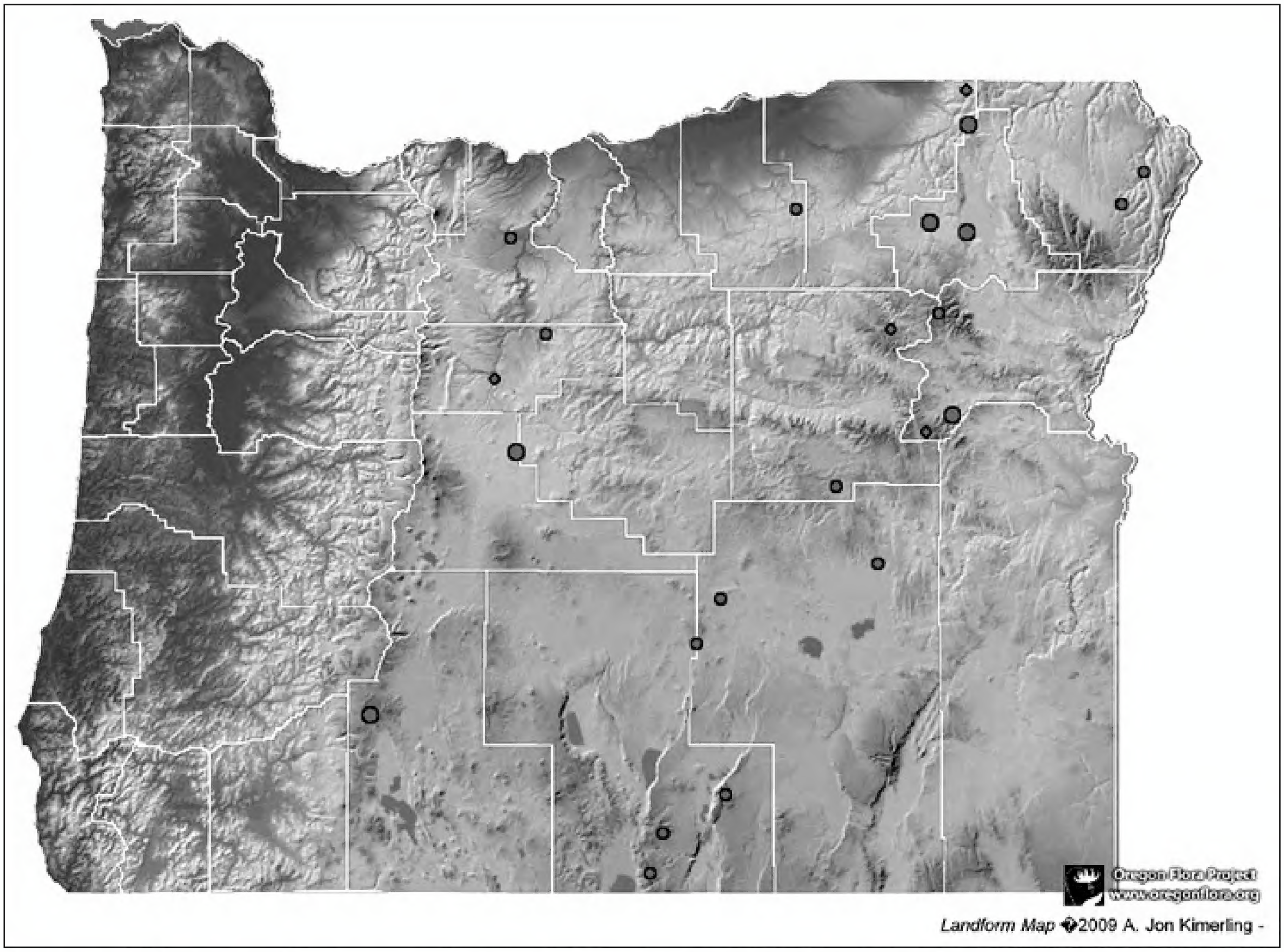
Locklear JH. 2009. Nomenclatural innovations in *Phlox* (Polemoniaceae), with updated circumscription of *P. caespitosa*, *P. douglasii*, *P. missoulensis*, and *P. richardsonii*. Journal of the Botanical Research Institute of Texas 3:645-658.

Mason HL. 1951. *Phlox*. Pp. 408-413 *in* Abrams L, Illustrated Flora of the Pacific States, Volume III, Geraniaceae to Scrophulariaceae. Stanford (CA): Stanford University Press.

McKelvey SD. 1955. Botanical Exploration of the Trans-Mississippi West, 1790-1850. Jamaica Plain (MA): Arnold Arboretum of Harvard University.

Nuttall T. 1834. A catalogue of a collection of plants made chiefly in the valleys of the Rocky Mountains or Northern Andes, towards the sources of the Columbia River, by Mr. Nathaniel B. Wyeth, and described by T. Nuttall. Journal of the Academy of Natural Sciences of Philadelphia 7:5-60.

Peck ME. 1941. A Manual of the Higher Plants of Oregon. Portland (OR): Binfords & Mort.



Distribution of *Phlox douglasii* in Oregon; map courtesy of the Oregon Atlas Project. www.oregonflora.org/atlas.php

Key to the cushion-forming phlox species in Oregon

1a. Plant a subshrub, branched from the base like a shrub and annually producing herbaceous flowering growth that dies back to woody tissue at the end of the growing season; growth habit generally open with internodes typically apparent, but can be more condensed under harsh environmental conditions…2
  2a. Calyx-membranes conspicuously carinate (raised lengthwise into a keel-like ridge)…**Phlox austromontana**
  2b. Calyx-membranes flat to somewhat plicate (raised lengthwise into a flattened fold)…3
    3a. Pubescent with glandular hairs throughout; leaves somewhat acicular (needle-shaped) and stiff, their surfaces pilose (beset with relatively sparse, soft, slender, more or less erect hairs) to glabrate (very sparsely hairy) with fine gland-tipped hairs; primarily dry to xeric habitat on the Columbia Plateau and in Blue Mountains region…**Phlox douglasii**
    3b. Pubescence not glandular; leaves linear (narrow with sides parallel over most of length) to linear-subulate (narrowly triangular) and only moderately rigid; primarily moderate to high elevations in the Klamath and Cascade mountains… **Phlox diffusa**
1b. Plant a perennial herb (with no woody tissue in shoots) forming more or less compact mats, cushions, or mounds…4
  4a. Calyx-membranes conspicuously carinate (raised lengthwise into a keel-like ridge) and strongly bulged toward the base…**Phlox aculeata**
  4b. Calyx-membranes flat to weakly carinate…5
    5a. Leaf margins bearing coarse, conspicuous cilia; in Oregon limited to alpine/subalpine habitat in Blue Mountain region…**Phlox pulvinata**
    5b. Leaf-cilia fine or lacking altogether…6
      6a. Inflorescence-herbage glandular-pubescent (with gland-tipped hairs) nearly throughout; calyx-membranes tending to be narrow; in Oregon limited to alpine habitat on Mount Hood…**Phlox hendersonii**
      6b. Inflorescence-herbage pubescent but with glandular hairs sparse or lacking altogether; calyx-membranes tending to be broad…7
        7a. Plant a diffuse mat; mostly glabrous (lacking hairs) to sparsely pilose (beset with relatively sparse, soft, slender, more or less erect hairs); leaves broadly linear (narrow with sides parallel over most of length); calyx-lobes with a conspicuous elevated midrib, joined by depressed, deep-seated calyx-membranes; in Oregon limited to montane forest in Blue Mountain region…**Phlox multiflora**
        7b. Plant a compact mat or cushion; more or less canescent (beset with dense vesture of fine relatively short gray hairs) on portions of the leaf and calyx; leaves tending to be subulate (narrowly triangular); calyx-lobe midrib only moderately elevated and membranes not markedly depressed…8
          8a. Leaves densely crowded and overlapping, closely appressed (lying flat against the stem) and often 4-ranked with stems quadrate (appearing square in cross-section); leaves 3-5 mm long, broad-subulate (broadly triangular) to narrowly lanceolate (lance-shaped), covered with dense wooly hairs at least at base; south-central Oregon…**Phlox muscoides**
          8b. Leaves less crowded, stems appearing round in cross-section; leaves 6-12 mm long, often linear (narrow with sides parallel over most of length), usually stiff and pungent (very sharp), often loosely pubescent with somewhat cobwebby hairs; central and eastern Oregon…**Phlox hoodii**

Wherry ET. 1938. The Phloxes of Oregon. Proceedings of the Academy of Natural Sciences of Philadelphia 90:133-140.

Wherry ET. 1941. The Phloxes of Idaho. Notulae Naturae of the Academy of Natural Sciences of Philadelphia 87:1-15.

Wherry ET. 1942. The phloxes of Nevada. Notulae Naturae of the Academy of Sciences of Philadelphia 113:1-11.

Wherry ET. 1955. The genus *Phlox*. Philadelphia (PA): The Morris Arboretum of the University of Pennsylvania.

Wherry ET. 1962. A controversial treatment of the Polemoniaceae. Madroño 16:270-271.

Wherry ET. 1965. Relationships of *Phlox caespitosa*, *pulvinata*, and *douglasii* (Polemoniaceae). Sida 2:154-156.

Wherry ET. 1969. *Phlox* and *Polemonium* (Polemoniaceae) in the Intermountain Region. Sida 3:441-444.

Young JA, Evans RA, Major J. 1977. Sagebrush steppe. Pp. 763-796 *in* Barbour MG, Major J, eds., Terrestrial Vegetation of California. New York (NY): Wiley-Interscience.

Jim Locklear is a botanist and horticulturist living in Lincoln, Nebraska, and is director of conservation for Lauritzen Gardens in Omaha, Nebraska. He received a BS in Biology from the University of Central Missouri and MS in Plant Science from Southern Illinois University. Locklear recently completed work on a book on the genus *Phlox* that will be available from Timber Press in 2011.

Georgia Mason: Eleven Summers Alone in the Wallowas

Rhoda M. Love
393 FulVue Dr., Eugene, OR 97405

(Adapted from an essay that will appear in Plant Hunters of the Pacific Northwest, edited by A. R. Kruckeberg and R. M. Love)

Georgia Mason (1910-2007) was an Easterner who had lived in Oregon for only three years when she set out in 1961 to compile a flora of the Wallowa Mountains in the northeastern corner of our state. She left her home and teaching position in New Jersey in 1958 to work on a Master of Science degree at Oregon State College (now OSU). At the time of her move she had been teaching grades one through nine in the New Jersey public schools for twenty-seven years, and there is strong evidence in OSU files that she expected to return to that occupation after completing her advanced degree. However, the glorious scenery of our mountain West must have caused her to change her plans, for she remained here for the rest of her life. Georgia Mason became one of Oregon's major plant collectors and published two local floras before she died in Eugene three years ago at the age of 97.

Mason, whose birth name was Georgia Mavropoulos, was born in West Orange, New Jersey, on March 16, 1910, the middle of three daughters of Greek immigrants Peter and Bessie Mavropoulos. Georgia attended high school and college in her home state, studying to become a public school teacher. In 1931, still in New Jersey, she began teaching grades one through seven in Wallington, remaining there for ten years. It is said that she changed her name to Mason at this time so that it might be more easily pronounced by her pupils. After completing college correspondence courses in science, Mason moved to Passaic to teach General Science to grades six through nine. She taught there for 17 years throughout World War II and the Korean conflict. However, Georgia's life would suddenly change because, on October 4, 1957, on the barren steppes of Kazakhstan, the Russians launched Sputnik I and transformed the world!

When the Soviet Union reached space before the United States, America took a good look at its educational system and did not like what it saw, especially in the field of science teaching. Plans were quickly made at the Federal level to improve the training of scientists—notably in the public schools. The National Science Foundation offered incentives for teachers, and Georgia Mason, after 27 years of teaching in New Jersey, applied for and was awarded a grant to study for a Masters of Science degree at Oregon State College across the country in Corvallis. Georgia was a private person who left few written records of her activities–not even a collecting notebook–thus I have attempted to piece together an account of her life in our state from University of Oregon files, notes she left at the University of Arizona, OSU transcripts, herbarium records of her plant collections, and brief correspondence. Her niece, Susan Teller of New York, and various people who knew her in Oregon also provided recollections, for which I am grateful.

Georgia Mason, age 48, as she appeared when she entered Oregon State College in 1958. This is the only photo known to exist from her time in Oregon; courtesy of Valley Library Archives and Special Collections.

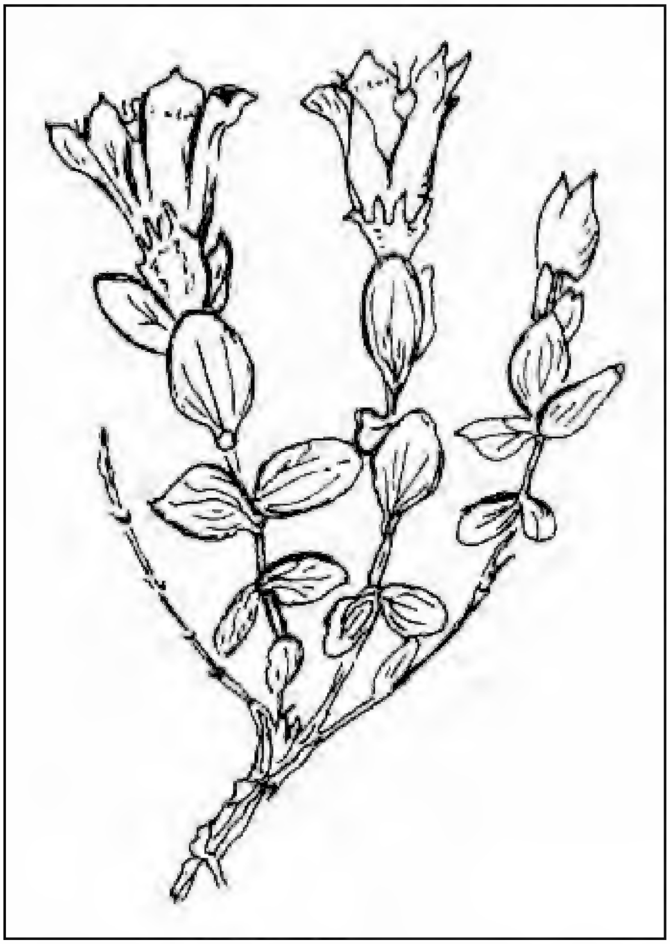
"On to Oregon!"

In September 1958, Georgia Mason (age 48) climbed into her green 1954 Chevrolet and left Clifton, New Jersey, for Oregon. In Corvallis, she rented an apartment near campus and registered for Botany 411, Entomology 412, Education 507, and Natural Resources 421 and 590. Although OSU records show that her New Jersey Superintendent clearly expected her to return at the end of the two-year course of study, except for brief visits to the East, she would live in the West for the remainder of her life. In the Botany Department at OSC, Georgia soon met Dr. Helen Gilkey and her students. Gilkey was 72 years old and retired when Georgia arrived in 1958, but was still actively writing botanical publications and working in the herbarium most days. She had previously published *Livestock-Poisoning Weeds of Oregon, Aquatic Plants of the Pacific Northwest*, and *Weeds of the Pacific Northwest.* Helen encouraged other women to seek careers in botany as she had done. Her students Patricia Packard and La Rea Dennis were co-authors with her of publications such as *Winter Twigs* and *Handbook of Northwest Flowering Plants*, and Dennis was writing a Masters thesis on the flora of Mount Ashland. Georgia Mason had entered an academic world where women were respected and encouraged to publish floristic works. It is likely that the newcomer was both impressed and inspired by these interactions.

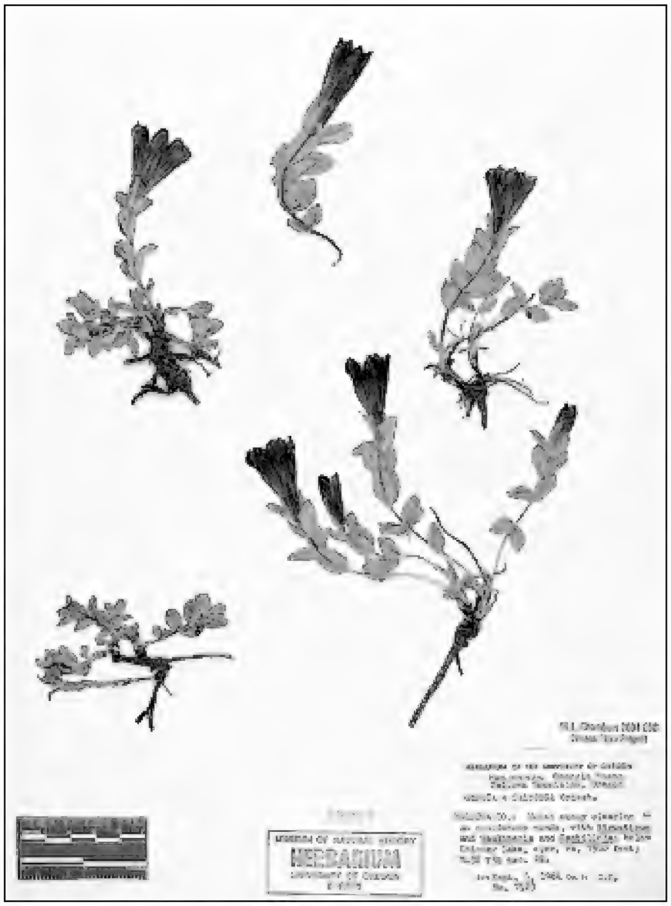
Another important connection for Georgia was established that same year, when, in one of her classes, she met fellow graduate student and PhD candidate, George Van Vechten. Like Georgia, Van Vechten was from the East (New Jersey and Vermont), where he had earned his Master's Degree at Rutgers. At OSC, he was doing research for his thesis on the geology and ecology of the Three Sisters Mountains of central Oregon. He and Georgia were laboratory partners and began to study together. He remembers her as "very outgoing and a lot of fun to be with." (Van Vechten, pers. comm. 2008). When the snow melted in the Three Sisters high country, George invited Georgia to go hiking and plant collecting with him. At some point they chartered a plane to fly over the rugged peaks to photograph the glaciers and forests. Once, they were snowed in during an early fall storm and spent the night at Sunshine Shelter. In March 1960 they took a spring break trip to botanize in the Southwest, hiking and collecting at Lake Mead, in Death Valley, and the Grand Canyon. After Georgia was introduced to the thrill of backcountry explorations and plant collecting, it is not surprising that, at the end of her two years of graduate work in Corvallis, she chose not to return to teaching public school in New Jersey!

Georgia Discovers the Wallowa Mountains

Georgia received her Master of Science Degree from Oregon State College in August 1959 and began to collect plant specimens in western Oregon. That winter she made a very short visit to her family in New Jersey. In June of the following year, George Van Vechten completed his PhD and left Corvallis to teach at Eastern Oregon College in La Grande, located in the foothills of the Wallowa Mountains. He recalls that Georgia visited him there and that the two hiked into the Wallowa high country. Georgia's niece told me that her aunt truly fell in love with the mountains at this time. OSU herbarium records indicate that Georgia began her serious study of the Wallowa flora in the spring of 1961; Kenton Chambers, newly hired Associate Professor of Botany and Curator of the OSU herbarium, recalls Georgia working on her Wallowa specimens in the herbarium at that time (Love 2008). Oregon Flora Project records show that she collected in Wallowa, Union, and Baker Counties from April to the end of August that first summer. I do not know when Mason began to contemplate compiling a flora of the area, but it seems reasonable that the example of Helen Gilkey and her students LaRea Dennis and Patricia Packard persuaded Georgia to undertake this project. At the time she was 51 years old and most likely living on savings, although this situation temporarily changed the following year.



Georgia's drawing of mountain gentian, *Gentiana calycosa* appeared on page 269 of her flora. This may well have been her favorite Wallowa species. Used by permission from the University of Oregon Museum of Natural and Cultural History.

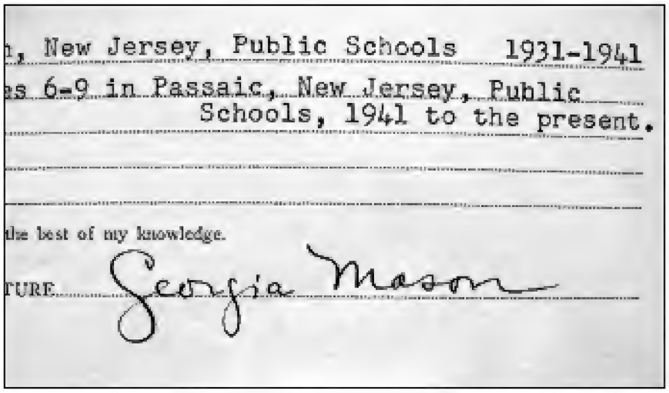


Georgia collected *Gentiana calycosa* on September 6, 1964, near Chimney Lake, elevation 7,500 feet. Photo of OSU herbarium sheet by Gene Newcomb.

In the introduction to her Wallowa Flora and the accompanying map, Georgia Mason described the vast and rugged the territory she covered during eleven summers of botanical collecting in the Wallowas. She wrote that she concentrated mostly on that portion of the Wallowa Mountains designated as Eagle Cap Wilderness (established in 1940), an area of roughly 350 square miles dominated by 9,838-foot Sacagawea Mountain. Four major streams arise in this area and flow in a north-northwesterly direction: the Minam River, the Wallowa, the Lostine, and Hurricane Creek. Besides Eagle Cap, other high peaks Georgia explored were Chief Joseph Mountain, Aneroid Mountain, Petes Point, Sentinel Peak, and the 9,826-foot Matterhorn, with, as she wrote, "a gleaming limestone dome at its peak." "Though rugged," she declared, "all these trails are accessible to the hiker." (Apparently, even when that hiker was a rather diminutive person in her 50s, carrying collecting gear, probably including an awkward tin vasculum.) According to UO records, Georgia was five feet one inch tall and weighed 120 pounds. The lowest elevation included in her study area was Wallowa Lake. "From here," she wrote, "trails lead into the high country." Other points of entry she used were at the ends of the roads at Hurricane Creek, Sheep Creek, Lostine River, Bear Creek, and Eagle Creek (Mason 1975).

A Lean Time and a Sense of Humor

The University of Oregon in Eugene hired Georgia Mason as Acting Assistant Curator of the UO herbarium during the sabbatical leave of Curator LeRoy Detling during the 1961-1962 academic year; University records indicate that her total remuneration was under $4,000 (Personnel records, U of O Archives and Special Collections). Georgia moved to Eugene, rented an apartment near campus, and took charge of the day-to-day running of the herbarium, which was then part of the Museum of Natural History near the University Science Building where Cascade Hall is located today. She spent most of each summer in the Wallowa Mountains, collecting over 300 specimens in both 1961 and 1962. The former was an exceptionally busy year for her; she collected heavily in eastern Oregon as well as in the Three Sisters area, in Washington State, Nebraska and Wyoming. At this time, she and Van Vechten lost touch with each other; he believed that she had moved back to New Jersey.



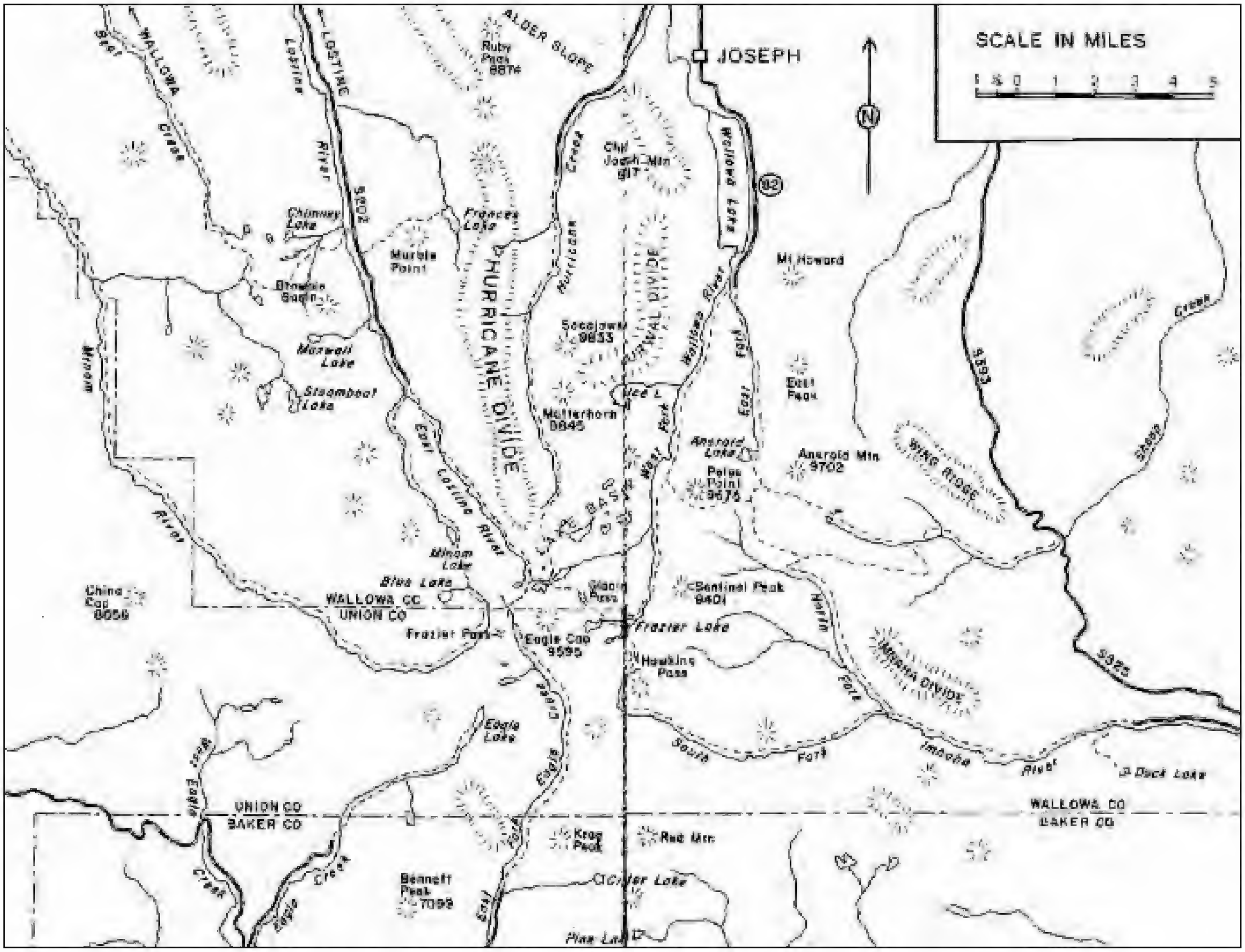
, New Jersey, Public Schools 1931-1941
es 6-9 in Passaic, New Jersey, Public
Schools, 1941 to the present.

the best of my knowledge.

TURE Georgia Mason

Georgia Mason's signature as it appears on her Application for Admission to Oregon State College (now OSU) on January 30, 1958. Courtesy of Valley Library Archives and Special Collections.

Upon Curator LeRoy Detlings's return to the herbarium in the fall of 1962, Georgia once again became unemployed, but chose to remain in Eugene, which would be her home for the remainder of her life. University of Oregon records show that she lived in at least three rental properties between 1962 and 1964. Since Georgia spent summers in the Wallowa Mountains, and was receiving



Map of the Wallowa Mountains by John Christy from Georgia's Flora. Used by permission from the University of Oregon Museum of Natural and Cultural History.

no salary, it is likely that she gave up her apartments during the summer months. She apparently lived on savings for eight years, 1962 through 1969, as she did not enjoy salaried employment in Oregon until she returned to the University of Oregon herbarium as Acting Curator from 1970 to 1976. Meanwhile, she worked steadily on her Wallowa Flora.

Georgia was not the first plant hunter to botanize extensively in the Wallowa Mountains. William Conklin Cusick (1842-1922) collected heavily there between 1875 and 1915 (Love 2007a) and William Hudson Baker (1911-1935) spent summers there in 1952, 1953, and 1955 (Love 2009). Cusick's specimens were available for study at the U of O herbarium in Eugene and Baker's at OSU in Corvallis.

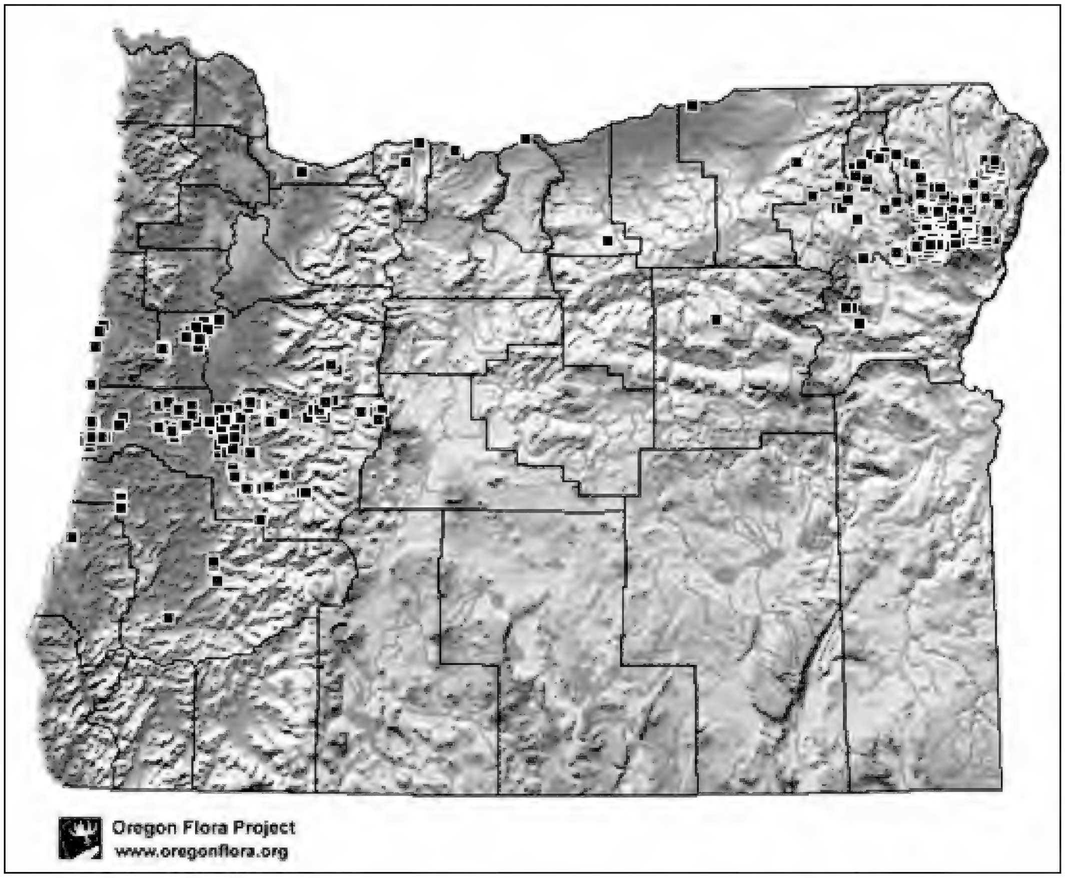
In March 1967, Georgia wrote to Dr. Chambers from the Arizona herbarium in Tempe. Her detailed collecting notes still on file there indicate that she was making use of their facilities to identify and prepare labels for her hundreds of pressed specimens from northeastern Oregon. In the Introduction to her 1975 Flora of the Wallowas, she thanks Dr. Donald J. Pinkava and Elinor Lehto of Arizona State University "for use of the herbarium facilities at Tempe during 1967-1970." She also did research at the University of Idaho and at Washington State University. Why she did not work at an Oregon herbarium during these years is one of several of mysteries about her life.

From Oregon Flora Project records, notes she left in the herbarium at Arizona State University, and several letters saved by Dr. Chambers, we are fortunate to know other details about Georgia Mason's activities during this unemployed period. These records show that she collected in the Wallowa Mountains each year between 1961 and 1971, spending entire summers in the mountains she loved for a full decade until she was over 60 years of age. During this period, in 1967 and again in 1969, Ken Chambers corresponded with Georgia about collections she was donating to the OSU herbarium. On June 27, 1967 she wrote to Dr. Chambers from Joseph, Oregon: "I'm literally drowning in specimens I brought back here to Joseph so I can send them off to their destinations…. I want to thank you again for the use of your herbarium, the textbooks, the shelf space, the microscope, and the pleasant associations …" It seems clear from this letter that Georgia was essentially homeless during the summers; her detailed collecting records strongly suggest that she spent the majority of her nights in campgrounds. Dr. Chambers replied to thank her for the 1,210 specimens she had thus far donated to OSU.

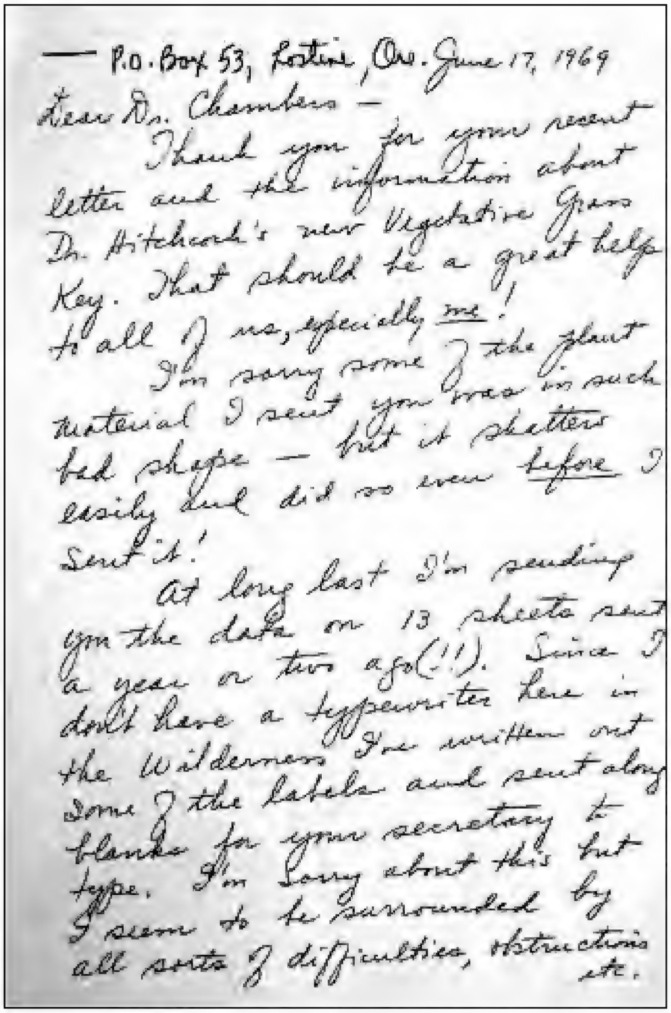
In a July 6 letter that same year Georgia wrote to Dr. Chambers: "Since the U. of Oregon gives me no support financially would you be willing to accept specimens sent C.O.D. by cheapest possible means?" Later, in June of 1969 she writes him a note from Lostine which, at the end, reveals a wry sense of humor: "We had a collision of 2 electrical storms about a week ago with resulting hailstones 1 ¼" diameter and oceans of water which has broken bridges, overflowed all creeks, rivers, lakes and resulting mudslides in the mountains have closed 3 of the 4 major trails up into our mountains…the Forest Service thinks those 3 trails may not be opened at all this summer! Rough on those happy 'hunters' who haul in cases of beer!" Like other botanists before and after her, Georgia Mason attempted to locate "head of Keystone Creek, 9000 feet," where W.C. Cusick collected the original specimen of *Lomatium greenmanii* on August 4, 1900; however, she was unsuccessful, stating in her Flora," apparently not collected since the type collection" (Mason 1975). It is not clear whether she studied the type specimen, named in 1938 by Mildred Mathias and archived at the Rancho Santa Ana Botanic Garden in Claremont, California.

Employed Again: the University of Oregon

In 1970, Georgia Mason's lean financial period came to a temporary end when she was once again hired by the University of Oregon as Acting Curator of the herbarium following the death of LeRoy Detling. She held this non-teaching position for seven years during which time her salary



Map of Georgia Mason's collecting sites in Oregon, courtesy of the Oregon Flora Project. Each dot represents numerous collections. Georgia Mason has over 4,500 pressed specimens in the Oregon State University herbarium.



— P.O. Box 53, Lostine, Ore. June 17, 1969
Dear Dr. Chambers —
Thank you for your recent
letter and the information about
Dr. Hitchcock's new Vegetative Grass
Key. That should be a great help
to all of us, especially me!
I'm sorry some of the plant
material I sent you was in such
bad shape — but it shatters
easily and did so even before I
sent it!
At long last I'm sending
you the data on 13 sheets sent
a year or two ago(!!). Since I
don't have a typewriter here in
the Wilderness I've written out
some of the labels and sent along
blanks for your secretary to
type. I'm sorry about this but
I seem to be surrounded by
all sorts of difficulties, obstructions
etc.

June 1969 letter from Georgia Mason to Ken Chambers, mailed to Corvallis from Lostine during one of her all-summer collecting trips in the Wallowa Mountains. (Also available is a July 6, 1967 letter in which she verifies that the UO gives her no financial support.)

rose from $3,700 to a reasonable high of $12,900 (UO Archives and Special Collections). According to David Wagner, who followed her as Curator, Georgia accomplished a prodigious amount of work. She continued to gather data for her Flora of the Wallowa Mountains, collecting on the Lostine River and at Target Springs in 1970, and in 1971 at Lick Creek and near the town of Wallowa, as well as in Lane County. These were to be her final full summers in the Wallowa Mountains. In Eugene that year she also mounted, labeled, and accessioned the approximately 3,000 specimens collected by Oregon botanist Lilla Leach, incorporated the approximately 3,800 collections of Eugene dentist-botanist Orlin Ireland, acquired much-needed herbarium cases, prepared new genus covers, and formally accessioned hundreds of specimens (Wagner 1994).

When David Cole of the University's Anthropology Department became Georgia's Department Chair in 1971, he advised her that her primary responsibility should be to complete and publish her Wallowa Flora (David Cole, pers. comm.). The book needed an artist, so Dr. Cole arranged for his 19-year old son, David Eric Cole, to draw plant illustrations. Young Cole, who had just graduated from high school and was waiting to join the navy, completed 600 or 700 drawings for the book that summer; his remuneration was one dollar per drawing. The younger David Cole remembers Georgia telling him that during her Wallowa summers, she made friends with some of the elderly miners she met during her summers in the mountains (David Eric Cole, pers. comm. 2008).

John A. Christy of the Oregon Nature Conservancy remembers meeting Georgia in 1972 when he first began learning Oregon's flora and fauna. He writes, "At the time, the University's Museum of Natural History was pretty much a darkened morgue with ancient exhibits…I might have met Georgia as she was passing through the exhibit hall…Later, while discussing *Hamamelis* with Georgia in 1974, I happened to sketch a flower in order to illustrate a point. When she saw I could draw, she hired me on the spot to do some illustrations and the map for her Wallowa book…. Georgia had no work-study students in the herbarium, but methodically puttered on chores all by herself with her customary blue lab coat and a small lab cart. She kept busy annotating Wallowa material, sending out loans, and single-handedly labeling new genus folders for the entire collection. She was not given to chatter, but [told me] some interesting stories about the Wallowas and her collecting there" (Christy, pers. comm.). John Christy was paid five dollars per drawing and completed approximately 75 illustrations and the map for the book between January and March 1975.

At the time Mason was working on her catalogue of Wallowa plants, other major Northwest floras were appearing: *Illustrated Flora of the Pacific States* by Leroy Abrams and Roxana Ferris (1923-1960); the second edition of Morton Peck's *A Manual of the Higher Plants of Oregon* (1961); and C. Leo Hitchcock's five-volume and single-volume works (1955-1973).

I knew Georgia Mason slightly during her final years at the University of Oregon herbarium shortly before her retirement. I began work on my PhD in the fall of 1975, Georgia's last official year at the University. Mine was an ecology project involving insect feeding on hawthorns, and I visited the herbarium from time to time to borrow collecting materials. I found Georgia to be friendly and helpful, if perhaps a bit brusque. She was usually busy mounting, curating, and filing specimens. Several of Georgia's hand-written letters survive in the UO Personnel files; one, dated June 21, 1972 contains her wish for the future of the herbarium: "I do sincerely hope that financial conditions at the University will make it possible to continue the invaluable existence of both the Herbarium and the Museum for the benefit of untold students of life on earth into the indefinite future." (UO Archives and Special Collections)

Georgia's 411-page *Guide to the Plants of the Wallowa Mountains of Northeastern Oregon* was published by the Museum of Natural History of the University of Oregon in December 1975 and reprinted with additions and corrections in 1980. The second edition remains in print and is available at the Museum in Eugene.

During her final two years as Herbarium Curator at the University of Oregon, Georgia collected and catalogued wetland and weedy species of Eugene and Lane County. She reluctantly retired in 1976 at the age of 66 when David Wagner was hired as Curator. Dr. Wagner has written, "After retirement she kept a door key and came into the herbarium to work evenings and weekends. She did not stop coming until all her collections were mounted. After that she stayed away feeling she might be in the way despite my encouragement for her to work there as much as she wished. I know she was rather bitter towards the UO over being forced into retirement. She would have continued happily for another ten or twenty years." What neither Wagner nor Mason could foresee at this time was that the U of O herbarium would cease to exist only a dozen years later when its 100,000-specimen collection was moved to Oregon State University (Wagner 1994). Georgia Mason was listed in University of Oregon Catalogues as Honorary Curator until the specimens were moved to Corvallis in 1993. As stated earlier, she deposited no collecting notebooks at either college.

Frances Lake and the upper Lake Creek drainage, located about two miles east of Lostine River. Georgia collected here on August 12, 1964. According to her records, flowers seen here in August included species of *Arnica, Silene, Phacelia, Arabis, Ranunculus* and *Potentilla*. Photo by Ed Alverson.

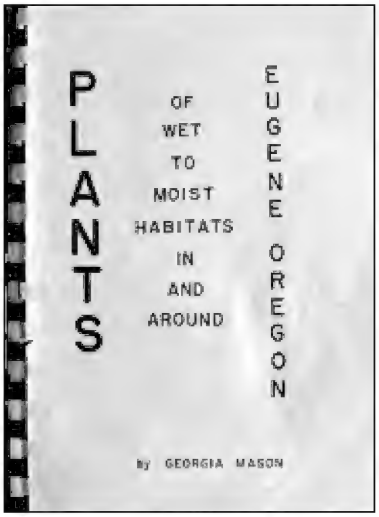
Life Following Retirement

About the time of her retirement from the University of Oregon, Georgia showed her appreciation to the Botany Department at Oregon State University in Corvallis by contributing $5,000 as an endowment to finance student work in the OSU herbarium. Known as the "Georgia Mason Herbarium Fund," the 1978 gift has been invested to provide funds for student workers to participate in the day-to-day operating activities of the herbarium and its programs. Georgia stipulated at the time that her donation be used to "assist students who are interested in plant taxonomy, and to support research and teaching in this field of botany." Probably she had in mind Dr. Gilkey's and Dr. Chambers' kindnesses to her over the years. (Helen Gilkey had died at age 86 in 1972.)

Georgia Mason's second and last book*, Plants of Wet to Moist Habitats in and Around Eugene Oregon*, was self-published in 1982 and sold in bookstores and by mail from her home. The 207-page, spiral-bound book, copies of which are filed in the UO Special Collections and at the Lane Community College Library, is out of print and difficult to obtain today. For a number of years after retirement, Georgia Mason taught adult education field botany courses at Lane Community College in Eugene and led local plant walks, frequently to wetland sites. Otherwise, an increasingly reclusive person, she lived quietly with her dogs in various rented apartments in Eugene. She spent a number of years in a modest duplex in Eugene's Danebo neighborhood. Some of those who had known Georgia at the University lost track of her, but her Danebo neighbors remember her as a quiet, reserved, and private person who nonetheless loved animals, birds, and gardening.

Georgia Mason's Legacy

What can be said of Georgia Mason's botanical legacy? For over a decade, from 1961 through 1971, she collected, alone and unpaid, in the rugged Wallowa Mountains. Her book on the area's flora has not been superseded and is in print and in use today. Oregon Flora Project records reveal that, with 4,549 herbarium specimens to her credit, Georgia Mason is far and away the most assiduous of Oregon's female collectors. Among all Oregon collectors to date, she ranks fourth in number of collections after Morton Peck of Willamette University, and L. F. Henderson and LeRoy Detling of the University of Oregon. During the writing of her Wallowa flora, because she lacked the background to name species, Georgia Mason was careful to send problem specimens to taxonomic experts to be identified. A few of her herbarium sheets were found to be mislabeled when the University of Oregon herbarium was moved to Oregon State University, and botanists Kenton and Henrietta Chambers have located and annotated these with the correct names. Despite these errors, with eleven full summers of collecting alone in the rugged Wallowas, and with two published floras (Mason 1975, 1982) to her credit, Georgia Mason *née* Mavropoulos, a former grade school teacher born in New Jersey the child of Greek immigrants, may rightfully claim a place in the pantheon of Oregon botanists.



PLANTS OF WET TO MOIST HABITATS IN AND AROUND EUGENE OREGON

by GEORGIA MASON

Cover of Georgia Mason's book, *Plants of Wet to Moist Habitats in and Around Eugene Oregon*, self-published in 1982 and now out of print but available in the University of Oregon Special Collections and the Lane Community College Library.

Georgia was no longer living in Eugene's Danebo district at the time of her death on October 8, 2007 (Love 2007b). It is not known where in the area she lived during her final years; her niece, Susan Teller, came to Oregon from New York City to handle the final arrangements. Georgia Mason was quietly cremated and there was no funeral. Susan Teller has told me that she and Georgia were always very close friends and that she is the person commemorated in Georgia's Wallowa Flora:

To Susan
whose confidence,
encouragement
and unflagging interest
have made this flora possible.

Afterword

In January 2010, the Native Plant Society of Oregon petitioned the Wallowa National Forest to name a geographic feature for Georgia Mason. We were subsequently informed that such a dedication could not be considered until the honoree had been deceased for at least five years. We plan to renew our petition in 2012, one hundred and two years after the botanist's birth.

Acknowledgements

I sincerely thank the following for their invaluable help with the researching and writing of this essay: Georgia's niece Susan Teller of New York; the Arizona State University herbarium staff: D. Pinkava, Elizabeth Makings, and L. Landrum for Mason collecting records; Elizabeth Nielsen, OSU Valley Library Archives and Special Collections for the Mason photo and official records; George Van Vechten, David Cole, David Eric Cole, David Wagner, John Christy, Charlene Simpson, Judith Manning, Marcia Cutler, and Cheshire Mayrsohn for recollections; James Fox and Heather Briston of the University of Oregon Knight Library Archives and Special Collections for Mason's UO employment records; Professor Emeritus Kenton Chambers for his recollections and letters; Aaron Liston, Richard Halse, and Stephen Meyers for use of OSU herbarium resources; Oregon Flora Project staff: Linda Hardison, Thea Cook, Katie Mitchell, Gene Newcomb, and Jennifer Sackinger for Mason's Oregon collecting records and images; Bernadine Croco for genealogy; Ed Alverson for photos; Gene Yates, Jenifer Ferriel, and Paula Brooks of the Wallowa National Forest for their support; Pam Endzweig for University of Oregon permissions. Clayton Gautier and Judith Manning improved the historic photo of Georgia. I thank Cindy Roché, Kenton Chambers, Frank Lang, and Jennifer Love for editorial comments. I dedicate this essay to the botanists at Oregon State University–Georgia Mason never forgot the friendship, respect and support she received at OSU and neither shall I.

References

Love RM. 2007a. Pioneer botanist William Cusick: his dark and silent world. Kalmiopsis 14: 8-16.

Love RM. 2007b. Georgia Mason (1910-2007). Oregon Flora Newsletter 13(3):14.

Sketch of Georgia Mason as she appeared in the field following her retirement from the University of Oregon. The artist is Judith Manning of Eugene, a participant in several of Mason's Lane Community College botany classes.

Love RM. 2008. Georgia Mason and the Flora of the Wallowas. Sidebar *in* Alverson ER, Zika P, Ferns and Friends in the Wallowa Mountains, Oregon. Kalmiopsis 15:29.

Love RM. 2009. Botanist William H. Baker (1911-1985): captivated by isolated floras. Kalmiopsis 16:31-36.

Mason G. 1975. Guide to the Plants of the Wallowa Mountains of Northwestern Oregon. Eugene (OR): UO Museum of Natural History. (Revised by the author in 1980).

Mason G. 1982. Plants of Wet to Moist Habitats in and around Eugene, Oregon. Self-published. (Out of print; available at UO and Lane Community College Libraries.)

Mathias ME. 1938. A revision of *Lomatium*. Annals of the Missouri Botanical Garden. 25:225-297.

Wagner D. 1994. History of the University of Oregon Herbarium (1903-1993). Kalmiopsis 4:6-11.

Georgia Mason's Eleven Summers in the Wallowa Mountains 1961 through 1971

Mason's earliest and latest collected taxa for each season, based on Oregon Flora Project data.

1961. Earliest: April 11 at Deal Canyon near LaGrande, Union County: *Dodecatheon conjugens*. Latest: August 30 at Sunshine Lake, Wallowa County: *Aster occidentalis*.

1962. Earliest: June 23 along Hurricane Creek: *Fragaria virginiana* var. *platypetala*. Latest: September 28 at Wallowa Lake Moraine: *Madia gracilis*.

1963. Earliest: May 20 on the Joseph-Imnaha Highway: *Lithophragma parviflorum* var. *parviflorum*. Latest: October 13 outlet from Duck Lake: *Sparganium angustifolium*.

1964. Earliest: May 18 above Lick Creek Road: *Primula cusickiana*. Latest: October 30 at the Wallowa Lake west moraine: *Epilobium brachycarpum*.

1965. Earliest: May 27 junction of Falls and Hurricane Creek: *Juniperus scopulorum*. Latest: October 6 along the Wallowa Power House Road: *Crepis capillaris*.

1966. Earliest: May 27 at Target Springs: *Ranunculus orthorhyncus* var. *platyphyllus*. Latest: September 21 Falls Creek-Hurricane Creek area: *Artemisia ludoviciana*.

1967. Earliest: July 13 on the east moraine above Wallowa Lake: *Piperia unalascensis*. Latest: September 16 on the Hurricane Creek Trail: *Botrychium virginianum*.

1968. Earliest: July 14 on the John Henry Lake Trail: *Castilleja viscidula*. Latest: August 24 on the Polaris Trail near Tenderfoot Pass: *Castilleja fraterna*.

1969. Earliest: May 27 on the Lostine River Road 10 miles south of Lostine: *Draba nemorosa*. Latest: September 14 on the Black Marble Quarry Road southwest of Enterprise: *Rosa nutkana* var. *hispida*.

1970. Earliest: May 25 at the bridge over Lostine River: *Corydalis aurea* ssp. *aurea*. Latest: September 8 at the same site: *Agoseris glauca* var. *glauca*.

1971. Earliest: June 27 in the Target Springs area: *Castilleja oresbia*. Latest: August 30 at Blue Lake south of Minam Lake: *Castilleja chrysantha*.

GUIDE to the PLANTS
of the WALLOWA MOUNTAINS
of NORTHEASTERN OREGON

Front cover of Georgia Mason's *Guide to the Plants of the Wallowa Mountains,* second printing with additions, March 1980. Georgia's 411-page flora is available for sale at the University of Oregon Museum of Natural and Cultural History. Contact: Terry Church, Museum Store Manager, tachurch@.uoregon.edu

Rhoda Love demonstrates a vasculum, the metal container used by botanists before the invention of plastic bags. The empty tin vasculum weighs approximately five pounds and is considerably heavier when filled with plant specimens layered with wet grasses. This vasculum was recently surplus property at the Oregon State University herbarium and is now the author's much-prized souvenir of the past. Photo by Bryan Haynes.

Botanizing in the Swala-lahos Floristic Area

Kathleen Sayce
PO Box 91, Nahcotta WA 98637

Aerial view of Saddle Mountain from the southeast: note the extensive meadows on the middle and western peaks. The mouth of the Columbia River is in the background, with Clatsop Plains to the left, Astoria to the right, and the south end of the North Beach Peninsula at the top. Photo by Kathleen Sayce with Frank Wolfe as pilot.

Swala-lahos is the English interpretation of an aboriginal name for Saddle Mountain in south central Clatsop County (Giesecke 1991), the site of a Chinook origination story, and the legendary home of the Thunderbird. Saddle Mountain rises 3,266 feet to three peaks (the saddle), and is the tallest mountain in the Coast Range between the Olympic Mountains and a Miocene basalt plateau in Tillamook County (Niem and Niem 1985, Walsh *et al.* 1987).

The general boundaries of the Swala-lahos Floristic Area (SFA) begin on a north line running east in Pacific County, Washington, from the entrance to Willapa Bay east up the Willapa River, which then turns south to follow the eastern boundary of Pacific and Clatsop counties, bisecting Wahkiakum County west of the Skamokawa River, and continuing south just east of Nicolai Ridge on the Clatsop County line to the Nehalem River. It then turns west on the north side of the Nehalem River, taking in Oswald West State Park and the southern slopes of Neahkahnie Mountain in north Tillamook County, Oregon.

This area lies mostly within the summer fog zone, west of the Coast Range in northwestern Oregon and adjacent southwestern Washington. Bisected by the Columbia River and flanked on the west by the Pacific Ocean, this is a region of cool, relatively rain-free summers and mild, wet winters (Maas 2008, Taylor and Hatton 1999). A climatic mix of summer fog and winter rain supports abundant forest epiphytes. At sea level, three to ten inches of rain typically fall each month during the wet season; less than one inch per month in the dry season. Rain-free periods in the summer typically last 30 to 50 days, but may exceed 90 days. Annual precipitation increases with elevation: near sea level, 85 to 90 inches are typical; elevations above 2,000 ft. normally receive more than 150 inches.

The SFA encompasses about 1,800 square miles, and contains extensive coniferous forests, as well as a variety of wetland, riparian and tidal habitats, and grasslands ranging from sea cliff to montane rocky outcrops, and high elevation balds. This area is generally too wet for Oregon white oak (*Quercus garryana*) and Pacific madrone (*Arbutus menziesii*) in the western half of the coastal mountains, and provides habitat for most of the known populations of Queen-of-the-forest (*Filipendula occidentalis*).

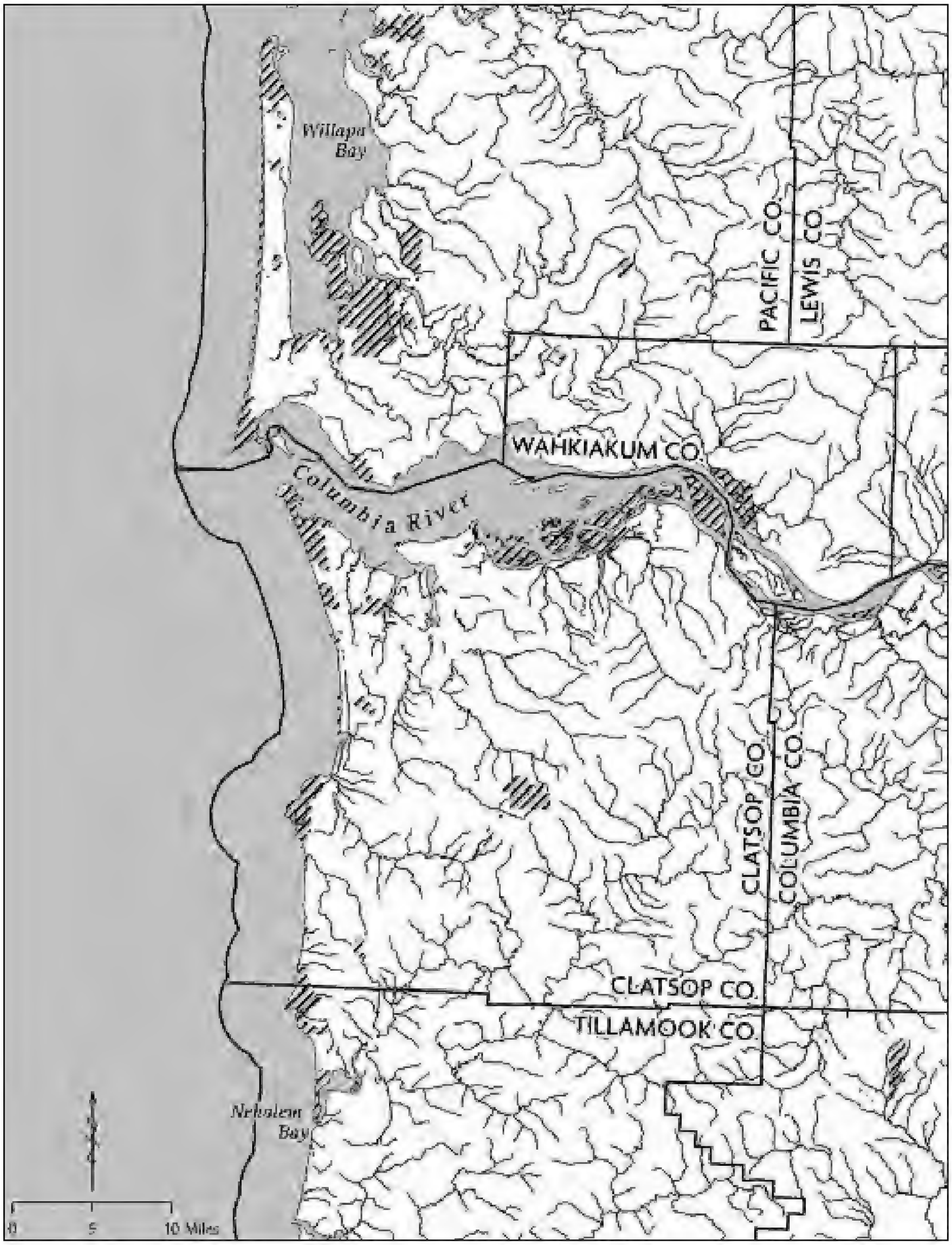
Land Use

In this article, I use the term "coast range" for the mountains both north and south of the Columbia River, although in Washington, these coastal mountains are called the Willapa Hills. These ranges share geology and geomorphology, climate, soils and vegetation. They also share historic and present land use patterns, with farming in the river valleys, cranberry farms among the sand dunes, commercial forestry in the timbered hills, fishing in the rivers, and resort and residential areas along the Pacific coastline. The SFA is near the north end of a larger geologic unit, the Coast Range Zone, which extends south along the coast from the Chehalis River in Washington to the western Klamath Mountains in southern Oregon. The larger Coast Range Zone is commonly recognized as a geologic and plant community unit, and often includes, floristically, the Olympic Mountains (Pojar and MacKinnon 1994).

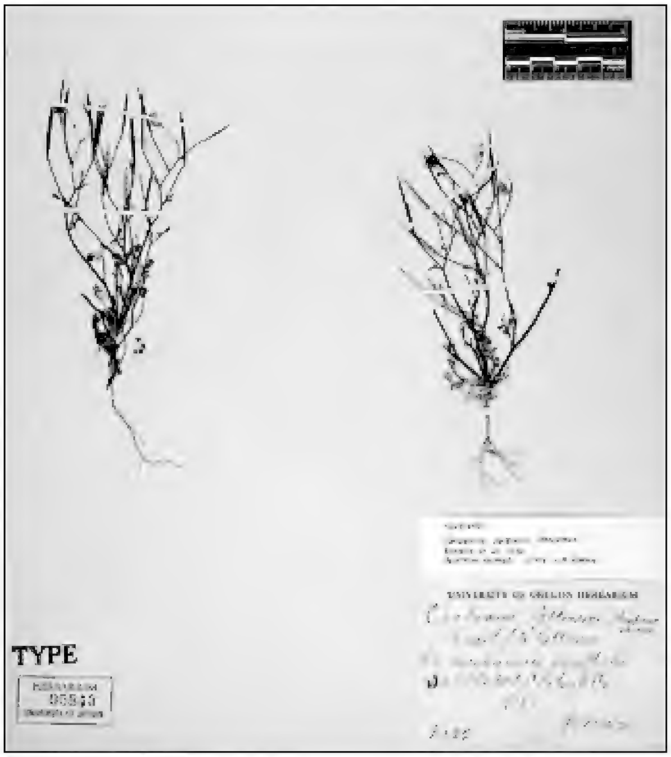
Unlike the Olympic and Cascade mountain ranges, there are few conservation areas within this region and none are large (see map). Including state and federal parks and small private holdings, no individual conservation unit exceeds ten thousand acres in size. Conserved lands represent less than ten percent of the landscape; the remainder (public and private) is managed for commercial timber, agriculture and shellfish. Some forest units have been harvested repeatedly, beginning more than 150 years ago. The last large stands of old growth on private land were logged as recently as the 1980s, and these are now in their first regeneration cycle. Surviving old growth comprises less than three percent of the total forestland area (Sayce 1998).

The effect of fire on ecosystems was historically different south of the Nehalem River Valley, where native people regularly set fires (Agee 1996), in contrast to the northern coast region, where intervals between wildfires were much longer. Inland, in the Willamette–Puget Trough, which has a drier climate, tribal burning to clear land was also more common.

The major landscape disturbances today are urbanization, roads and timber harvesting. Urban areas are concentrated at low elevations along the ocean and rivers. Commercial forests are regularly logged on a 35 to 50 year interval. Logging roads average more than six linear miles per square mile of forestland; four paved highways cross the Coast Range in the SFA (Sayce 1998). There are no significant roadless areas and only a few miles of undeveloped coastline. Four key landscape features distinguish the SFA from the rest of the Pacific Northwest region: 1) it lies south of the line of Pleistocene continental ice; 2) the mountains are either formed of Miocene flood basalts or



Map of Swala-lahos Floristic Area, with conservation areas shown by black hatching. Analisa Fenix, Chief Cartographer, Ecotrust, Portland, Oregon, assembled databases to provide a general map of the region, including public parks and public and private conservation areas. Data layers came from Ecotrust, Washington Department of Natural Resources, Washington Parks and Recreation Commission, National Park Service, The Nature Conservancy, Pacific County, and US Fish and Wildlife Service. Some privately conserved lands and mitigation areas are not shown.



Type specimen of *Cardamine pattersonii* from OSU herbarium.

are capped by this material and surrounded by extensive marine sediments; 3) its plant communities are not as affected by regular wildfire as are those to the south and east; and 4) most of the area is commercial forestland, managed for timber under short rotation regimes.

A Treasure Trove for Botanists

As a member of the Vancouver Expedition (1790-1794), Scottish surgeon Archibald Menzies (1754-1842) was likely the first naturalist to observe plants in the region. He returned to Britain with notes and seeds, stimulating others to take a closer look at flora of the west coast of North America. Meriwether Lewis (1774-1809) was the next known visitor; the Corps of Discovery came down the Columbia River in the fall of 1805, built Fort Clatsop, and stayed until the spring of 1806 (Eid and Johnson 2005). Lewis spent much of a rainy winter studying and sketching local trees. David Douglas (1799-1834) arrived in 1825 on a quest for new and novel plants for the London Horticultural Society; he explored the lower Columbia River with fellow Scotsman John Scouler (1804-1871), and returned in 1832-33, just before his last trip to Hawaii. Two naturalists on the Astor Expedition, American John K. Townsend (1809-1851) and English botanist/zoologist (and Harvard professor) Thomas Nuttall (1786-1859) arrived in 1834.

Thomas Jefferson Howell (1842-1912), the region's first resident botanist, began his study of plants on Sauvie Island where his family farmed, and visited Clatsop County in 1887. Late in the 19th century, Louis Henderson (1853-1942) summered in Ilwaco, Washington, where his wife's family lived, and made several notable collections in the Columbia River Estuary, including his namesake checkermallow, *Sidalcea hendersonii* (Gisler and Love 2005). While at the University of Oregon, Henderson returned several times to

Access for Botanical Exploration

Until 1991, private forestlands and roads were open to the public. Private forestland owners enjoyed property tax breaks for providing recreational opportunities to the public, and were generally held not liable for accidents. Weekend trips into the hills were traditional recreation for local residents; activities included fossil hunting, fishing, hunting, camping, or just driving the roads. (My family and our neighbors camped every summer on a river in the Coast Range; one of my earliest memories is floating on that stream in a tethered inner tube.) However, open access had some negative aspects: vandalism of equipment; dumping of trash along logging roads and in streams was, and is, a chronic problem; accidents in remote areas are without means of emergency assistance; private vehicles are a hazard to heavily-laden log trucks on these narrow roads.

Open access ended in the 1990s. Teenagers in Astoria had developed a game they called 'looping,' driving logging roads at night at high speeds, often while drinking. In 1991, two teens "looping" on a logging road south of Astoria ran their car off the road, fell several hundred feet, and died. Their parents sued the landowner for wrongful death, and won a settlement of $8.5 million in 1993. Two years later this verdict was overturned on the grounds that access to the forests was a community good, so the landowner could not be held liable for accidents (Lavis & Navarro vs. Cavenham Forest Industries 1993, Clatsop County Circuit Court). But, within months of the initial accident, the first of thousands of gates went up across logging roads. Even though the original settlement was overturned, gates have remained closed, continuing to bar access.

Gate technology keeps pace with those who desire entry enough to use bolt cutters, pull out or ram the gates with multiple vehicles, lift the gates out of the ground, or go around the gate ends. Regulated access is now the normal condition. State authorities may also fine people for trespass who drive gated logging roads without permission.

The impact is profound for naturalists. For nearly two decades, biological surveys have been limited to those sponsored by landowners, those with personal relationships with landowners, or to those willing to walk in on foot and stay off main roads. In other words, the only effective, ethical access for visitors is to maintain good personal relations with the landowners and enter with permission. The North Coast Land Conservancy (NCLC), led by Neal Maine, has worked with private owners for years to allow biological surveys on their lands. In exchange, the NCLC does not abuse this privilege; they do not use survey findings to force owners to change management practices or attack them publicly for land management policies. The landowners are the first to be informed of any important biological discoveries. While the survey group and NCLC are committed to conservation of fragile and important landscapes, maintaining a good working relationship with landowners comes first.

Saddle Mountain and other northwestern Oregon sites. One of his students, John Rollo Patterson, discovered Saddle Mountain bittercress (*Cardamine pattersonii*) in 1928, which Henderson named for him (Henderson 1930).

Other early 20th century botanists who collected in the SFA included Wilhelm N. Suksdorf (1867-1935), Morton Eaton Peck (1871-1959), Martin Woodlock Gorman (1853-1926), Carl C. Epling (1894-1968), L.N. Goodding (1880-1967), Le Roy Abrams (1874-1956), Harold St. John (1892-1991), G.B. Rossbach (1910-), W. Bridge Cook (1908-1991) and Helen Gilkey (1886-1972).

After World War II, Professors C. Leo Hitchcock, LeRoy E. Detling and Kenton Chambers botanized extensively in the SFA, along with many students. Detling, and later Chambers, wrote papers on the flora of montane balds of northwestern Oregon (Detling 1953, Chambers 1973). Detling studied plant distributions, particularly in xeric regions, and was the first to write about an interesting overlap of floras from other areas in the SFA. He noted that some species extended no further north, or south, than the northwest Oregon Coast Range (Detling 1954). Chambers expanded on this theme a few decades later, when he inventoried additional peaks, including Angora and Sugarloaf (Chambers 1974). Two endemic species honor the work of these botanists in northwestern Oregon: *Micranthes hitchcockiana* (formerly *Saxifraga hitchcockiana* (Elvander 1984)), and *Castilleja chambersii* (Egger and Meinke 1999).

Cathy Maxwell began compiling site lists for the Willapa Hills,

Recollections of Clatsop County Botany

Kenton L. Chambers

Sometime in my early years as Curator of the Oregon State University Herbarium, I was advised by Mr. Oliver Matthews[1], "You ought to visit Onion Peak in Clatsop County; I think you'll find something interesting." An opportunity to do so arose in 1971, when a student at OSU, Dennis Rittenback, offered to guide me there through the recently logged forestlands surrounding the peak. Dennis was a native of Cannon Beach and had himself been involved in these logging operations, which, as we found, had thoroughly "skinned" what must have been a magnificent old-growth forest of spruce, fir, and cedar trees on all the steep slopes around the mountain. Reaching the peak was easy over a network of logging roads. From a landing at the base of the great summit monolith, we climbed the west side, where only a few years' shrub growth impeded the trail through the fissured rock face. According to Kathleen Sayce, this route is now thoroughly blocked by a thicket of 10-foot-tall salmonberry and blueberry shrubs. The summit, 2,818 ft. high, was a pristine wildflower garden, occupying cliffs, talus slopes, and a grassland about 2 acres in size, formed on thin soil over the basalt substrate. Such habitats are very similar to those on adjacent Saddle Mountain, but on Onion Peak they are much smaller in total area. After this first visit, I made three further excursions up Onion Peak, accompanied first by colleagues from OSU, Bob Frenkel and Fred Rickson, and then by my wife Henrietta and our two children, ages 10 and 12. The extremely difficult ascent route encountered by very recent visitors there was obviously much simpler back when logging of the peak had only recently been completed.

These high Northwest peaks project like islands from a sea of dense coniferous forests, and their unusual floras, especially of herbaceous plants, include some endemic species as well as various taxa from the Olympics and Alaska, which are at their southern limit in this corner of Oregon. Still other species are disjunct here from the Cascades and farther east. Among the northern taxa reaching their southern limits, we found *Senecio* (now *Packera*) *flettii, Lewisia columbiana* var. *rupicola*, *Prenanthes alata*, *Erigeron peregrinus* var. *peregrinus*, and *Cladothamnus pyroliflorus*. The *Senecio* was a first report for Oregon, in fact. The taxa endemic to Northwest Oregon were *Cardamine pattersonii* and *Saxifraga* (now *Micranthes*) *hitchcockiana*, both previously known only on Saddle Mountain, as well as *Filipendula occidentalis*, of the Trask and Wilson Rivers region. There were two novel elements, which have since come under taxonomic investigation. In the gravelly grassland was a dwarf *Dodecatheon* (shooting-star), known already from Saddle Mountain, where it was going by the name *D. pulchellum*. Recently, further study and comparison of these plants with robust, low-elevation populations from along the Trask River have led to the description of a new species, *Dodecatheon austrofrigidum*. (illustrated on p. 25) The range of this taxon extends north to Mt. Colonel Bob in the southern Olympic Mountains. Although I had thought that, morphologically, its closest relationship was with *D. frigidum* of Alaska and northern British Columbia, DNA studies tie it closer phylogenetically with *D. dentatum*, the white-flowered, waterfall-loving species of the northern Cascades.

Also of interest was a form of *Castilleja*, discovered on cliffs at the summit of the peak, which I could not place in any described species. It was sent to an expert at an eastern U. S. institution, who suggested that it might be a new taxon, but no steps were taken to publish a description of it. Not until 1999 did Mark Egger and Bob Meinke examine it again, from my collections plus new material on Angora Peak just south of Onion, and in their publication they named it as *Castilleja chambersii*. The species is apparently a very local endemic, known at present only from Onion and adjacent Sugarloaf and Angora Peaks.

My publication comparing the flora of Onion Peak with that of Saddle Mountain appeared in 1973 (Chambers 1973). At the same time, Rittenback guided me to Sugarloaf Mountain, 2,874 ft. high and 3.4 miles north of Onion, having a small grassy bald at its summit. There we found some of the same endemic and disjunct taxa, including *Castilleja chambersii*, *Cardamine pattersonii*, *Micranthes hitchcockiana*, *Packera flettii*, *Lewisia columbiana* var. *rupicola*, *Erigeron peregrinus* var. *peregrinus*, and *Cladothamnus pyroliflorus*. A report was published in *Madroño* (Chambers 1974). Over the years, numerous plant collectors have visited Saddle Mountain, and from their specimens and my own collections, I have assembled an updated vascular plant checklist of 325 taxa, which is available from the author at <chamberk@science.oregonstate.edu>

---

[1] Oliver Matthews was the dendrologist/amateur botanist who discovered *Pinus sabiniana* in Oregon (*Kalmiopsis* 16:2-4).

north of the Columbia River, late in the 20th century. The Washington Native Plant Society published her species list for southwestern Washington in *Douglasia* (Maxwell 1991). During the same period, Duncan Thomas focused on the Columbia River Estuary (Thomas 1984) and John Christy on wetlands (Christy and Puttera 1993, Christy 2004). I also started cataloging wetland and coastal plants during this period, slowly moving into the hills on both sides of the Columbia River. After a while I recognized a similarity in species distributions north and south of the river, and began to see the region as floristically distinct, compared to adjacent areas to the north, south and east.

A common wetland forest community is characterized by red alder (*Alnus rubra*) and slough sedge (*Carex obnupta*). Minor components include ladyfern (*Athyrium filix-femina*), Hookers willow (*Salix hookeriana*) and Pacific crabapple (*Malus fusca*). Photo by Kathleen Sayce, west of Oysterville, Washington.

Plant Communities and Species Diversity

Even along the coast, dry periods in the summer interact with variations in topography and soils to enhance upland plant diversity, and through these plant communities, diverse faunal habitats. There are three distinct floristic components, with some overlap between them. These include, from Detling (1954): 1) Boreal – A boreal and high latitude component otherwise seen more fully in the Olympic Mountain Range, fifty miles north, and Cascades, sixty miles east, and across Boreal North America; 2) Xeric/Continental – A dry side component, which reaches greater expression in the east Columbia Gorge, sixty miles east; and 3) Californian – the California Floristic Province, which generally extends as far north as the Klamath and Coast ranges of southwestern Oregon.

Species from each of these floristic provinces appear in the SFA, where many of them reach the limits of their distribution (*i.e.,* the southern limit for boreal species, the northern limit for California species, and the western limit for Continental species. In addition to those three floristic components, there are coastal species and plant communities whose distributions along the Pacific Coast end within the SFA and extend no farther inland than the Coast Range. There are also endemic species. For a species list for the Swala-lahos Floristic Area, see www.reachone.com/columbiacoastplants; this website also has lists for public parks.

Coniferous and Hardwood Forests

The SFA is within the coastal Pacific Northwest rain forest biome. Dominant conifers include western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), Douglas fir (*Pseudotsuga menziesii*), Sitka spruce (*Picea sitchensis*), and above 1,500 ft., Noble fir (*Abies procera*) and Pacific silver fir (*A. amabilis*) (Franklin and Dyrness 1988, McCain and Diaz 2002). The highest site classes (sites of fastest tree growth) straddle the Columbia River along the West Coast, and peak in Clatsop County, Oregon, and Pacific County, Washington, where deep old soils, ample rainfall and moderate temperatures allow trees to grow almost year round (Soil Conservation Service 1986, 1988).

While hardwoods such as red alder (*Alnus rubra*) are common understory and colonizing species, mixed hardwood forests are largely confined to river bottomlands, *e.g.*, along the Columbia River. In these floodplains, red alder, big-leaf maple (*Acer macrophyllum*), black cottonwood (*Populus trichocarpa*), Oregon ash (*Fraxinus latifolia*), and several willow species (*Salix*) are common. Sitka spruce occurs on river floodplains where high winter tides may cover its large buttressed roots, the source of its other common name, tidewater spruce. Western hemlock and western red cedar also grow on floodplains in slightly higher sites, usually above the reach of winter high tides.

Wetlands

Inland from the ocean coast, with rock reefs, sea cliffs, ocean beaches and estuaries, wetlands extend upriver from salt to freshwater tidal areas, floodplains, perched bogs, marshes, and up into small streams, springs and seeps in the mountains. Almost every temperate hydrology regime known can be found here, each with its associated plant community (Thomas 1984, Kunze 1994, Howarth 1995, Eid 1996, Christy 2004). This diversity includes vernal pools and winter flowing streams and seeps on the beaches and seacliffs, seasonal and perennial streams in the coast range, true bogs, and fens.

The Columbia River is tidal throughout the Swala-lahos area. Tidal regimes include saltwater, a shifting brackish water interface, and freshwater tidal areas. Plant communities include tide flats, beaches, marshes, dense shrubby thickets and swamps worthy

Swale wetlands are common on Clatsop Plains and the North Beach Peninsula. Here, a shallow lake supports yellow pond lily (*Nuphar luteum*), floating mats and scattered shrub patches. The low floating mats are sphagnum moss, several sedges, russet cotton grass (*Eriophorum chamissonis*), and Labrador tea (*Rhododendron groenlandicum*). Willows, crabapple, red alder, Douglas spirea (*Spiraea douglasii*) and Sitka spruce (*Picea sitchensis*) fringe the swale. Photo by Kathleen Sayce, near Del Ray Beach Road, Warrenton, Oregon.

of Gulf Coast bayous (complete with nutria, and lacking only alligators for ambiance), along with diked, tidegated, ditched, drained and otherwise altered river islands and adjacent marshy to forested flats, now modified for agriculture.

Annual natural high flow on the Columbia River was driven by snowmelt and occurred from late spring to early summer. This pattern was altered by water containment structures. Fall and winter flow increased due to systematic water releases for hydropower production and shipping (Ebbesmeyer and Tangborn 1992). This modulated both freshwater surges and saltwater intrusion and altered plant and animal distributions. It also ended episodic sediment replenishment of associated wetlands during major floods.

The Columbia is a major shipping river. Duncan Thomas (1984), and later Cathy Maxwell (1991) found several dozen newly introduced species when they investigated beaches and islands on the Columbia River. Additional species new to this area continue to appear (D. Giblin, and Sayce, personal observations).

Salt water tidal streams are typically dominated by Lyngby's sedge (*Carex lyngbyei*). In this image, taken near Waikiki Beach at Cape Disappointment State Park, Lyngby's sedge is on the left, American dunegrass (*Leymus mollis*) is on the right, and European beachgrass (*Ammophila arenaria*) is in the upper right. Photo by Kathleen Sayce.

The dune fields on both sides of the Columbia River Entrance form complex fens, locally called bogs; wetlands in these dune fields are connected by groundwater under the surface topography of undulating dune and swale (Thomas 1995, Soil Conservation Service 1986, 1988). Dunes and swales run north-south, in alternating strips. The swales range from coastal wetland forests (swamps) to willow thickets, sedge meadows, floating sphagnum and sedge mats, and shallow to deep lakes (Howarth 1995, Eid 1996). Shallow, seasonal ponds in young dunes near the ocean beaches have vernal pool structure, and often contain Oregon fairy shrimp (*Eubranchipus oregonus*) (Russell Lewis, pers. comm.)

Slow-moving tidal streams drain the fens; these streams are locally called sloughs or, more colloquially, creeks. Some streams run all year; others flow only during the wet season. Urban and farm development prompted the installation of miles of ditches, dikes and weirs, which generally lower the winter water table. One slough had its course altered from west to north: the Skipanon River drains Cullaby Lake, south of Warrenton, Oregon and now flows north to the Columbia River instead of west to the Pacific Ocean. Cullaby Lake and Loomis Lake (between Long Beach and Ocean Park, Washington) have weirs to control water flow and

Summer dunes at Benson Beach, Cape Disappointment State Park, with North Head lighthouse in the background. Dunes are dominated by American beachgrass (*Ammophila breviligulata*) and European beachgrass (*Ammphila arenaria*), introduced grasses that have completely changed species composition of the dunes. The meadow to the right of the lighthouse is a Pacific reedgrass (*Calamagrostis nutkaensis*) community. The Cape Disappointment headland is the northernmost occurrence of this plant community on the Pacific Coast. Photo by Kathleen Sayce.

to impound water year round. These weirs also stabilize marshes around both lakes. Tidegates limit the intrusion of salt water along the ocean, Columbia River, and other estuaries.

Some lakes and older marshes have floating moss and sedge mats. Wetlands fill with peat deposits as they age, and go through a succession of plant communities from open water to floating sedge and moss mats along the edges, to covered mats over water, add marsh species, add shrub species, and finally host trees. The oldest wetlands are peat-filled, with trees, shrubs and marsh plants in diverse complexes. Highly diverse wetland communities include Gearhart Bog (Oregon), and wetland complexes associated with Cullaby Lake (Oregon) and Loomis Lake (Washington).

The youngest wetlands are closest to the ocean, have less plant diversity, and are usually dominated by slough sedge (*Carex obnupta*). Shrubs appear in wetlands more than fifty to seventy years old. Douglas spirea (*Spiraea douglasii*) is a typical dominant species in low elevation wet shrublands, along with several willow species. Shrub communities are also found on mineral and organic soils too wet for trees, but not so wet that only grasses and sedges will grow. Shrub communities are found on perched wet soils, talus, and rocky shelves. Typical shrubs include several *Vaccinium* species, salmonberry (*Rubus spectabilis*) and willows (*Salix*).

Streams in the Coast Range are numerous and highly dissected; fifth order streams are typical of local stream systems. Periodic mass wasting is common due to high precipitation, high winter stream flow, and a predominance of poorly consolidated marine sediments lining modern stream corridors. Sandstone and basalt outcrops can be found, but are not the dominant geologic materials through which streams cut. Streams are longer on the west side of the mountains, because there is more rainfall on this side to cut stream headwalls eastward. A rare endemic, Queen-of-the-forest (*Filipendula occidentalis*) grows on perennially wet basalt, usually along streams. Distributions of that species, long-awned sedge (*Carex macrochaeta*) and Cope's Giant Salamander (*Dicamptodon copei*) are limited to a few basalt-wall-lined streams and rock seeps in the SFA (Michael Patterson pers. comm.).

Meadows

Meadows or wildflower prairies appear in three different topographic areas: in sand dunes along the ocean, on sea cliffs, and in dry balds on shallow, rocky soils at higher elevations. Except for modern (young) dunes, these communities have high plant species diversity.

Dune prairies

Historically, dune prairies supported a diverse array of native species. Intentional and accidental introductions of European and American beachgrasses (*Ammophila arenaria, A. breviligulata*) for sand stabilization along the Pacific Ocean in the 19th and 20th centuries significantly reduced plant diversity in the dunes (Christy *et al.* 1998). Non-native beach grasses effectively trap sand, but also crowd out native plants and animals that require open sandy soils to thrive. Dense monocultures of *Ammophila* replaced the patchy, open communities of native American dunegrass (*Leymus mollis*). As a result, few remnants of native coastal dune prairie remain, and of those that do, all are now maintained by active suppression of weeds, shrubs and trees (Sayce 1990). None are now in immediate proximity to the ocean, due to urbanization, and changes in hydrology and sand deposition on ocean beaches. As expected, plant community changes have also impacted animals, several of which are now ESA-listed. Although full historic plant diversity cannot be regained, restoration efforts have maintained and improved several hundred acres of remnant high quality dune prairies (Camp Rilea and several NCLC units on Clatsop Plains, a small prairie north of Long Beach) and sandy, beach grass-reduced faunal habitat at Leadbetter Point (Pearson et al. 2009, Ritchie and Brennan 2010).

Sea Cliff Meadows

Sea cliff meadows occur north of the Columbia River on Cape Disappointment headlands, and south from Tillamook Head to Manzanita, Oregon in the SFA (Ripley 1984, Sayce and Eid 2004, Chappell 2006). These meadows are exposed, windy, winter-wet, summer-dry, salt-washed sites. They are sandwiched between sheer basalt cliffs and seabird rookeries on the ocean side, and coniferous forests on the upland side. Cryptogams are numerous on open rocks, and vascular plants drop out quickly as exposure rises to salt and wind. Plant communities go from forest to herbaceous meadow to cliff face, often in only a few steps. Sea cliff meadows become progressively more extensive and diverse going south into California. In the SFA, they are largely limited to narrow strips and patches. Farther north, conifers dominate the coastal fringe to the water line. Similar meadows appear on inland waters of Washington and British Columbia, with different species composition and substrates, and much lower annual

Seacliff grasslands include a low meadow plant community, dominated by Oregon fescue (*Festuca roemeri*) and Oregon stonecrop (*Sedum oreganum*), and a tall meadow, dominated by Pacific reedgrass (*Calamagrostis nutkaensis*). Here, the low and high meadows form a patchwork with salal (*Gautheria shallon*) and western sword fern (*Polystichum munitum*); inland is a coastal headland forest of Sitka spruce (*Picea sitchensis*). Winter photo by Kathleen Sayce at North Head lighthouse.

precipitation (Chappel 2006, A. Ceska pers. comm.).

Two sea cliff meadow types grow as far north as Cape Disappointment: a Pacific reed grass (*Calamagrostis nutkaensis*) community and a red fescue/stonecrop community, dominated by Oregon fescue (*Festuca roemeri*) and Oregon stonecrop (*Sedum oreganum*) (Ripley 1984, Sayce and Eid 2004). While these species range into Canada and Alaska, these meadow communities extend no farther north than Cape Disappointment.

Also at the north end of distribution at Cape Disappointment are coyotebrush (*Baccharis pilularis*) and seacliff bluegrass (*Poa unilateralis*) (Sayce 2002, Washington Natural Heritage Program 1999, 2003). Both species are increasingly common along the coast into California. Beach daisy (*Erigeron glaucus*) drops out north of Cape Falcon, just north of Manzanita, Oregon. Along the coast, Oregon or tough-leaf iris (*Iris tenax*) is found only from Ecola State Park south, though it grows inland in the coast range and Cascades to south-central western Washington.

Balds or Dry Meadows

Balds are hilltop and slope meadows in the coast range on basalt or basalt-derived materials. In the SFA, these meadows occur from 1,000 to above 3,000 feet, and face east to south to west. They are the sites of highest vascular plant diversity in the SFA, with a distinctive mix of Boreal, Xeric/Continental and Californian species. Species diversity is higher in larger meadows than smaller ones. The largest meadows are found on Saddle Mountain, which has three peaks above 3,000 ft, and more than two hundred acres of meadows and associated rocky slopes. Extensive meadows are also found on Onion Peak, Angora Peak and Neahkahnie Mountain. Meadows are smaller and less diverse north of the Columbia River on the west side of the coast range. Meadows intergrade between open rock and talus slopes; plants shift among those of dry open rock faces, mesic meadows with slightly more soil and into gullies. In wetter gullies and talus, with deeper soils and more moisture, shrubs and trees appear.

Long flowering seasons are typical, with different species blooming from early spring to late summer. To see most species in flower, one must plan to visit repeatedly from April to August; flowering is at a peak in June to early July. There are several endemics, and a number of species whose north, east or south distribution ends on a peak somewhere in the SFA.

Underlying the plants: a geological explanation

The past sixty million years of geologic history left distinct marks on the local landscape, many of which can be clearly seen today (Snavely and

Hitchcock's saxifrage (*Saxifraga hitchcockiana*) commemorates Dr. C. Leo Hitchcock, who botanized extensively in northwestern Oregon during the mid 20th Century. This image shows an atypical inflorescence, slightly domed instead of flat-topped. A small-flowered montia (*Montia parviflora*) is left of the saxifrage. Photo by Kathleen Sayce on Saddle Mountain.

Wagner 1963, Niem and Niem 1985, Walsh *et al.* 1987). Prior to the Eocene, the rock surface under the coast range was thousands of feet beneath the surface of the Pacific Ocean on the abyssal plain. During the Eocene, a new seafloor-spreading zone emerged; basalts from this period are the oldest and darkest in appearance. They are overlain by millions of years of marine sediments, interspersed with clays from weathered volcanic ash. These sediments hardened into sandstone, siltstone, mudstone, limestone and shale. Coal beds and bauxite layers were laid down along the eastern edge, west of the present day Cascades and east of the coast range. The seafloor-spreading zone eventually stopped spreading and started rising and subducting under the west edge of the North American Plate, becoming a shallow sea and then a large embayment; then as it docked with the North American Plate and lifted up, it became several estuaries and the coast range.

During the Miocene, 17 to 7 million years ago, Columbia Basin flood basalt repeatedly reached the coast, by flowing down ancient river valleys where flows intruded into porous sediments under high pressure. Some basalt flows formed large masses, such as make up present-day Saddle Mountain, or solidified as ring complexes, such as Angora Peak and Onion Peak, which form partial arcs. Niem *et al.* (2009) proposed recently that the line of mountains from Nicolai Mountain to Neahkahnie Mountain may sit in an ancient valley of the Columbia River, eroded out of the previous continental shelf and filled with marine sediments, into which Miocene flood basalts intruded. Other flows that originally snaked down river valleys are now perched along the tops of ridges. During the Pliocene, sea levels fell slowly, while the underlying plate continued to rise.

During the Pleistocene, two million years ago to ten thousand years ago, sea levels rose and fell by more than 400 feet several times, alternately flooding and exposing the continental shelf, which is currently flooded. The great glacial lake floods (Bretz or Glacial Lake Missoula floods) occurred at the end of the Pleistocene. These floods largely bypassed the SFA, except for slope undercutting along the Columbia River (leaving landslides that still move), and adding massive sediment deposits on the continental shelf (Soennichesen 2008, Marie Ferland pers. comm.). Many of these flood deposits became the initial sand supply for modern dune fields.

Around ten thousand years ago, after the last glacial maximum had warmed, the area entered a period of moderate temperatures with relatively stable sea levels (Pielou 1991). However, geologic conditions are rarely stable for long. The geologic plate that supports the coast range and the continental shelf is attached to the North American Plate. Sliding beneath its west edge is another plate; slippage in this subduction zone triggers large earthquakes and tsunamis, akin to the size of the Boxing Day quake off Sumatra in 2004, and off central Chile in 2010. The last local subduction zone earthquake occurred in 1700 (Atwater *et al.* 2005). The next earthquake could come at any time.

Modern landscape features that derive directly from these earthquakes include the dunes of Clatsop Plains and the North Beach Peninsula, and large amounts of buried wood in floodplains and marshes. There are also scattered standing dead forests in wetlands, usually of cedar, dating to the last subduction zone earthquake (in 1700). New beach-side dunes form in the years immediately after each earthquake (Peterson *et al.* 2000). The oldest dunes are 4,500 years old (on the east side of the dune fields), while the most recent dunes are only 310 years old and were on the ocean beach a century ago (Atwater *et al.* 2005, Peterson *et al.* 2000, Reckendorf *et al.* 2001).

Present day beach-side dunes are artifacts of recent sand accretion, not earthquake-derived. In the past century, additional sand

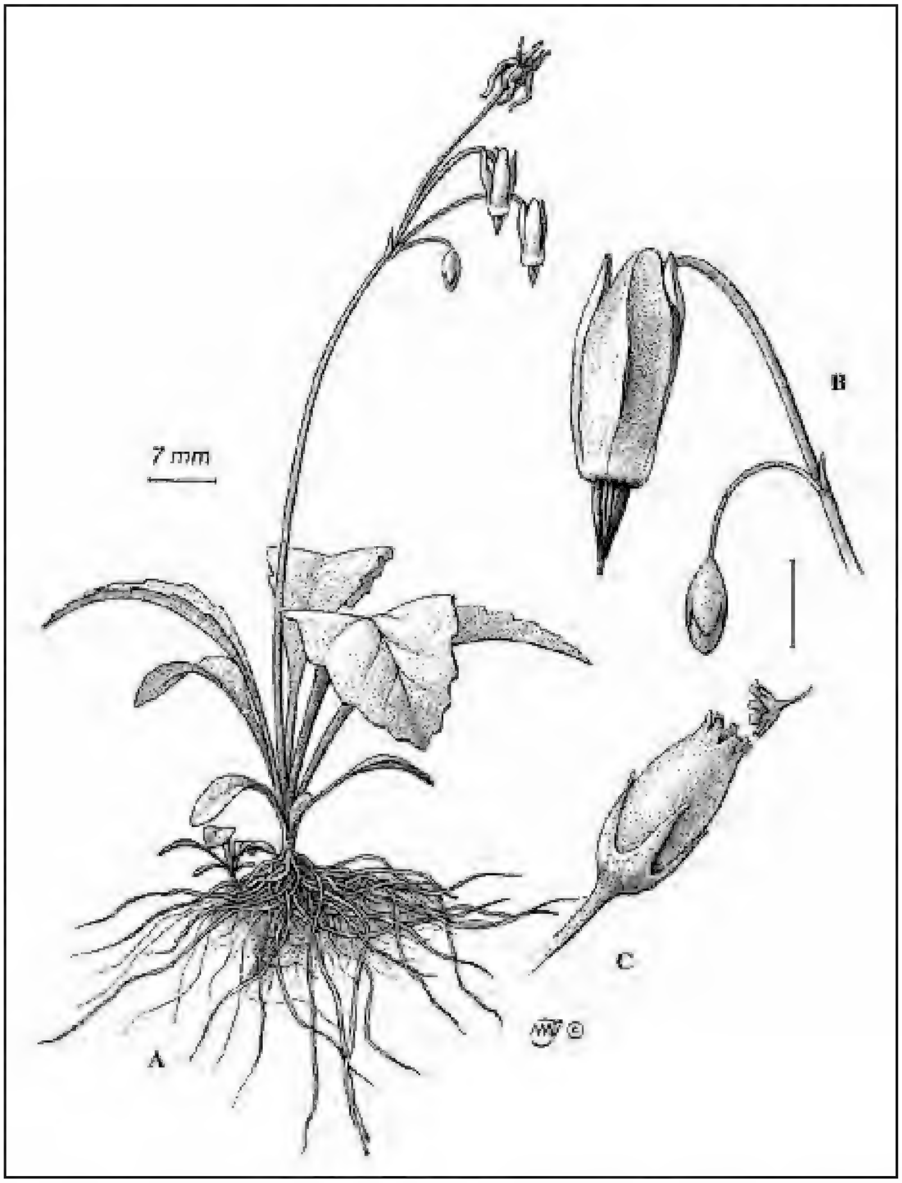
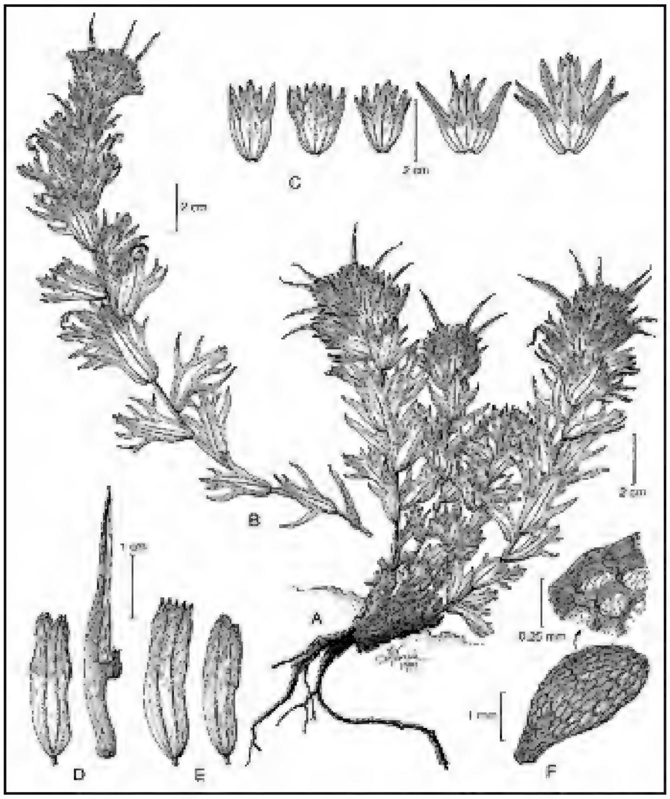


Illustration of *Dodecatheon austrofrigidum* described by Ken Chambers from his 1989 collection on the Trask River in Tillamook County. Line drawing by John Megahan.



Linda Ann Vorobik illustrated *Castilleja chambersii* for Mark Egger and Bob Meinke, who described the species in 1999 in honor of Ken's 70th birthday. This illustration graced the front cover of the Festschrift issue of *Kalmiopsis* in 2001, honoring Ken Chambers' contributions to Oregon botany.

accretion on the west edges of these dune fields extended each set of dunes west some thousands of feet, due to changes in hydrology and near shore sediment flows, induced by jetties at the Columbia River Entrance. These are fragile lands, which can be expected to erode landward with the next subduction zone earthquake (Peterson *et al.* 2000). Sea level has already come up enough to erode beaches where there are limited near shore sand deposits. In the past century alone, sea level in this area has risen one foot.

Modern wetlands and alluvial features also formed in the past few thousand years, including low elevation marshes, fens, swamps, floodplains, beaches along the ocean, local estuaries of the Columbia River and tidal streams that cross marshes and dunes to salt water.

Montane Geomorphology

In the Swala-lahos, all higher peaks are formed of or capped with Miocene basalt, a feature not found in mountains to the north of this floristic area. Basalts from three major flows (Wanapum, Grande Ronde and Saddle Mountains) are found in outcrops on the Washington side (Wells 1989).

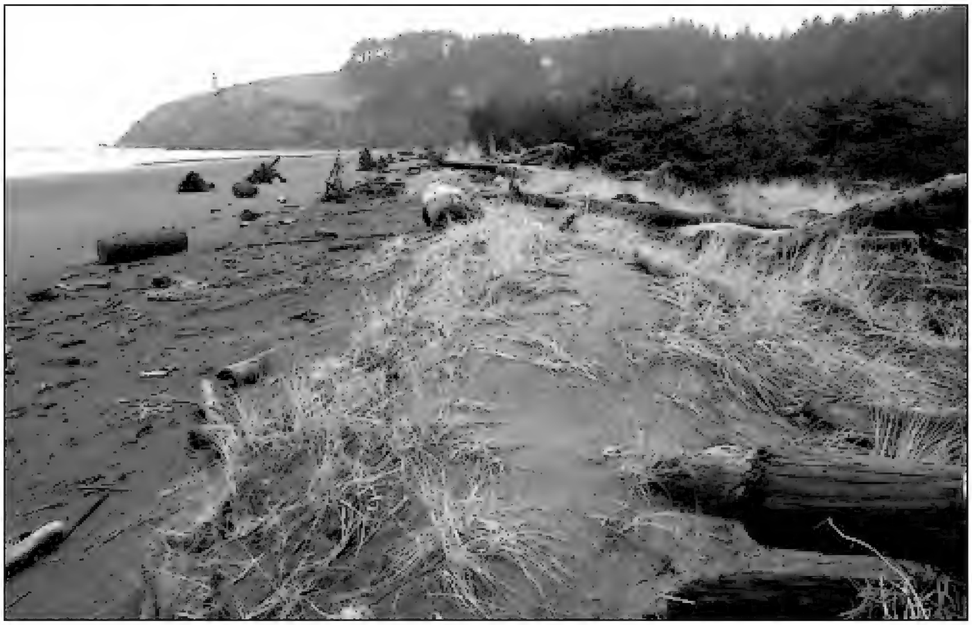
South of the Columbia River, Miocene basalt outcrops are common features of ridge tops, mountains, cliffs, and river gorges (Niem and Niem 1985). There is one Wanapum flow on Nicolai Mountain. Other Miocene basalt outcrops in northwestern Oregon are from the Grande Ronde period, and these may represent a series of intrusive lava flows into an ancient Columbia River Valley (Niem *et al.* 2009). Pillow basalts, breccia, sills, dikes, and large intrusive masses are among the formations.

Botanical exploration still leads to new discoveries

Although limited access has slowed the pace of discovery of endemic species, range extensions and cataloging of diversity, the following discoveries were made in the past two years:

- On Saddle Mountain, three new species, two are new county records: alpine lady-fern (*Athyrium alpestre*), nine-leaf desert parsley (*Lomatium triternatum*), and leafy mitrewort (*Mitella caulescens*).
- On Angora Peak, two new county records: giant blue-eyed Mary (*Collinsia grandiflora*) and maidenhair spleenwort (*Asplenium trichomanes*).
- On Nicolai Mountain, two new county records: northern green bog orchid (*Platanthera huronenesis*) and western clematis (*Clematis ligusticifolia*) along with handsome stands of twinflower (*Linnaea borealis*), Columbia lily (*Lilium columbianum*), and tough-leaf iris (*Iris tenax*).
- In a marsh associated with the Wallicut River east of Ilwaco, Washington, a new county record: Pacific rhododendron (*Rhododendron macrocarpum*).

When it comes to discovering new botanical species and expanding known ranges, the amount of time spent botanizing each area matters. Given how intensively Saddle Mountain has been visited for more than a century, these recent sightings are evidence that no individual botanizer is likely to encounter every species.



Some dunes are eroding landward. This winter image at Benson Beach, Cape Disappointment State Park, shows heavy high iron sands (black sands) on the beach, as light colored (and lighter mass) quartz and feldspar sands moved into the surf zone. Both American and European beachgrasses are in sere winter form. North Head lighthouse can be seen in the distance. Photo by Kathleen Sayce.

Access to sites also matters. Still largely unexplored are small basalt gorges, numerous small peaks and rocky slopes, hundreds of small wetlands, and thousands of miles of streams. The current discoveries mentioned above on Angora Peak are supported by years of work by North Coast Land Conservancy through relationships with local landowners.

A sense of perspective matters. One of the delights of botanizing this or any other diverse natural area is the certain knowledge that no one will ever see all the plants that grow here, though individuals can easily see representative examples of most plant communities. We have yet to resume the more methodical process of section visits and section-by-section species listing. The potential for further discoveries is excellent.

Acknowledgements

My companions in botanizing the SFA include Margaret McCarter, Nancy Eid, Christine Stanley, Julie Tennis, Cathy Maxwell, Beverly Arnoldy, Neal Maine, Mike Patterson, Thea Pyle, Doug Ray, Kelly Rupp, and Carla Cole. My husband Frank Wolfe climbed Saddle Mountain with me and shared his airplane repeatedly for aerial reconnaissance of sea cliffs, mountains and general landscape scouting. Bev Arnoldy constructed and maintains my website. Taxonomic support came from Dave Giblin, Peter Zika, Joy Mastroguiseppe, Richard Halse, Rhoda Love, and Kenton Chambers. Adoph Ceska helped with ecological distinctions between meadows of Pacific Northwest inner waters and outer coast. NCLC assists naturalists to gain access to private land; participants include Celeste Coulter, Neal Maine, Katie Volke, and board members Tom Horning and Doug Ray. The naturalists group includes Michael Patterson, Steve Warner and David Myers. Geologists who gave seminars, led field trips, and answered questions include Brian Atwater, Mary Ferland, Tom Horning, Curt Pederson, and David Yamaguchi. Russell Lewis collected fairy shrimp in vernal pools at Leadbetter National Wildlife Refuge in winter 2009, and sent them to Amy Kuritsubo, biologist, BLM, Bakersfield, California. She identified them as immature Oregon fairy shrimp, *Eubranchipus oregonus*. Michael Patterson proposed that some amphibians are substrate limited to basalt streams, based on his own work over several years. In coming years we plan to survey Miocene basalt river canyons to expand on this concept.

Queen of the forest (*Filipendula occidentalis*) is a rare endemic that grows on wet rocks, usually Miocene basalt, and is typically seen along streams. It grows only in the counties around the mouth of the Columbia River and Tillamook County. Photo by Kathleen Sayce on Onion Peak.

References

Agee J. 1996. Fire Ecology of Pacific Northwest Forests. Washington DC: Island Press. 505 pp.

Atwater B, Musumi-Rokkaku S, Satake K, Tsuji Y, Ueda K, Yamaguchi D. 2005. The Orphan Tsunami of 1700–Japanese clues to a parent earthquake in North America. USGS Professional Paper 1701, co-published with University of Washington Press. 140 pp.

Chambers KL. 1973. Floristic relationships of Onion Peak with Saddle Mountain, Clatsop County, Oregon. Madroño 22:105-114.

Chambers KL. 1974. Notes on the flora of Clatsop County, Oregon. Madroño 22:278-279.

Chappell CB. 2006. Plant associations of balds and bluffs of western Washington. Natural Heritage Rep. 2006-02 Washington Natural Heritage Program. Olympia (WA): Wash. Dept. of Nat. Res. http://www.dnr.wa.gov/nhp/refdesk/communities/pdf/balds_veg.pdf

Christy JA. 2004. Native Freshwater Wetland Plant Associations of Northwestern Oregon. ORNHIC, Oregon State University. 246 pp.

Christy JA, Kagan JS, Wiedemann A. 1998. Plant Associations of the Oregon Dunes National Recreational Area, Siuslaw National Forest, Oregon. USDA Forest Service, PNW Tech. Paper R6-NR-ECOLTP-09-98. 183 pp.

Christy JA, Putera JA. 1993. Lower Columbia River Natural Area Inventory. Report to the Nature Conservancy, February 3, 1993, Washington Field Office, Seattle. 75 pp.

Detling LE. 1953. Relict islands of xeric flora west of the Cascade Mountains in Oregon. Madroño 12:39-47.

Detling LE. 1954. Significant features of the flora of Saddle Mountain, Clatsop County, Oregon. Northwest Science 28:52-60.

Ebbesmeyer C and Tangborn W. 1992. Linkage of reservoir, coast and strait dynamics, 1936-1990: Columbia River Basin, Washington Coast and Juan de Fuca Strait. Interdisciplinary Approaches in Hydrobiology and Hydrogeology: 288-299.

Egger M, Meinke RJ. 1999. *Castilleja chambersii* (Scrophulariaceae), a new rare species from the northern Coast Range of Oregon. Brittonia 51(4): 445-451.

Eid N. 1996. Gearhart Bog Preserve: Distribution and abundance of non-native aquatic and native ombrotrophic plant species. The Nature Conservancy.

Elvander PE. 1984. The taxonomy of *Saxifraga* (Saxifragaceae) section Borophila subsection Integrifoliae in western North America. Systematic Botany Monogr. 3:34.

Franklin J, Dyrness CT. 1988. Natural Vegetation of Oregon and Washington. Corvallis (OR): Oregon State Univ. Press. 452 pp.

Giesecke EW. 1991. Dana on Saddle Mountain, 1841. Cumtux 11(4): 2-15.

Gisler M, Love R. 2005. Henderson's Checkermallow: the natural, botanical and conservation history of a rare estuarine species. Kalmiopsis 12:1-8.

Henderson LF. 1930. Some new species and varieties for Oregon. Rhodora 32:20-28.

Howarth J. 1995. Gearhart Bog Preserve: Plant community mapping and background information. The Nature Conservancy.

Kunze L. 1994. Preliminary Classification of Native, Low Elevation, Freshwater Wetland Vegetation in Western Washington. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA. 120 pp.

Maas C. 2008. The weather of the Pacific Northwest. Seattle (WA): Sasquatch Books. 281 pp.

Maxwell C. 1991. Vascular flora of the Willapa Hills and Lower Columbia River area of Southwest Washington. Douglasia 4: 27-76.

McCain C, Diaz N. 2002. Field Guide to the Forested Plant Associations of the northern Oregon Coast Range. USDA – Forest Service Technical Paper R6-NR-ECOL-TP-03-02. 250 pp.

Niem AR, Niem WA. 1985. Geologic map of the Astoria basin, Clatsop and northernmost Tillamook Counties, northwest Oregon: Oregon Department of Geology and Mineral Industries Oil and Gas Investigation 14, scale 1:100,000.

Niem A, Hagstrum J, Evarts R, Tolan T. 2009. Columbia River Basalts and Structure from the Gorge through the Forearc to the Washington/Oregon Coast: Tracing subaerial lavas to lava deltas, submarine pillow breccias, and mega-intrusive flows. GSA Annual Meeting, Portland, Oregon, October 22-24, 2009, session number 437.

Pearson SF, Sundstrom C, Ritchie W, Gunther K. 2009. Snowy Plover Population Monitoring, Research, and Management Actions: 2009 Nesting Season Research Progress Report. Washington Dept. of Fish and Wildlife, Wildlife Science Div., Olympia, WA. 38 pp.

Peterson C, Doyle D, Barnett E. 2000. Coastal flooding and beach retreat from coseismic subsidence in the central Cascadia margin. Engineering and Environmental Geology 6: 255-269.

Pielou EC. 1991. After the Ice Age: the return of life to glaciated North America. Chicago (IL): Univ. Chicago Press. 366 pp.

Pojar J, MacKinnon A, eds. 1994. Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska. Edmonton (AB): Lone Pine Press. 528 pp.

Reckendorf F, Peterson C, Percy D. 2001. The dune ridges of Clatsop County, Oregon. Oregon Department of Geology and Mineral Industries, Open File Report 0-01-07.

Ripley JD. 1984. Description of the Plant Communities and Succession of the Oregon Coast Grasslands. Oregon State University Ph.D. dissert. 234 pp.

Ritchie W, Brennan K. 2010. Restoration of a coastal dune ecosystem and its imperiled flora and fauna in Washington State. Poster session presented at: Creating Thriving Rural and Urban Communities through Ecological Restoration. Regional Conference of the Society for Ecological Restoration NW, and Washington Chapter of the Wildlife Society

Sayce K. 1990. Evaluation and proposed management of Oregon Silverspot butterfly habitat on Long Beach Peninsula, Washington. Washington Dept. Wildlife, 22 pp.

Sayce K, ed. 1998. Willapa Indicators for a Sustainable Community. South Bend (WA): Willapa Alliance. 38 pp.

Sayce K. 2002. Noteworthy Collection, Washington: *Baccharis pilularis*. Madroño 49:132.

Sayce K, Eid N. 2004. Plant Communities of Cape Disappointment State Park: A plant community survey of BLM-owned and ACE-owned portions of the Park. Washington State Parks & Recreation Commission. Contract PSC 305-089, 550 pp.

Snavely PD, Wagner HC. 1963. Tertiary geologic history of Western Oregon and Washington. Washington DNR Division of Mines and Geology, Report of Investigation Num. 22, pp 1-25.

Soennichesen J. 2008. Bretz's Flood: The remarkable story of a rebel geologist and the world's greatest flood. Seattle (WA): Sasquatch Books. 289 pp.

Soil Conservation Service. 1986. Soil survey of Grays Harbor County Area, Pacific County and Wahkiakum County, Washington. Washington, DC: Govt. Printing Office. 296 pp.

Soil Conservation Service. 1988. Soil Survey of Clatsop County, Oregon. Washington, DC: Govt. Printing Office. 272 pp.

Taylor GH, Hatton RR. 1999. The Oregon weather book: A state of extremes. Corvallis (OR): Oegon State Univ. Press. 242 pp.

Thomas B. 1995. Ground-water flow and water quality in the sand aquifer of Long Beach Peninsula, Washington. USGS Water-Resources Investigative Report 95-4026. 168 pp.

Thomas DW. 1984. The vascular flora of the Columbia River Estuary. Wasmann Journal of Botany. 42:92-106.

Walsh TJ, Korosec MA, Phillips WM, Logan RL, Schasse HW. 1987. Geologic Map of Washington – Southwest Quadrant. Washington Department of Natural Resources, Division of Geology and Earth Resources, Geologic Map GM-34.

Washington Natural Heritage Program. 1999. *Poa unilateralis*. 2 pp. http://www1/dnr.wa.gov/nhp/refdesk/fguide/pdf/poun.pdf

Washington Natural Heritage Program. 2003. *Baccharis pilularis ssp. consanguinea*. 2 pp. http://www1.dnr.wa.gov/nhp/refdesk/fguide/htm/fsfgabc.htm

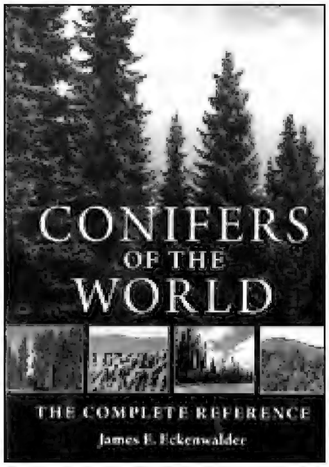
Wells RE. 1989. Geologic Map of the Cape Disappointment-Naselle River Area, Pacific and Wahkiakum Counties, Washington. USGS Miscellaneous Investigations. Map I-1832. Scale 1:62,500.

Kathleen Sayce was born in Ilwaco, Washington and earned a BS at Fairhaven College at Western Washington University, Bellingham, where she studied botany with Ron Taylor, Charles Martin, Maurice Dube, and Richard Fonda. Marine ecology, scientific illustration and geology were her undergraduate interests. She completed a MS in 1978 at Washington State University, under the direction of Amy Jean Gilmartin. She also worked on lichens and bryophytes with Noe Higgenbotham, WSU, and Doyle Anderegg, University of Idaho. In the mid-1980s she began to inventory wetland vascular plants, starting at Leadbetter Point, and held a series of ecological field jobs, studying the ecology of smooth cordgrass in Willapa Bay, coastal dune prairies, and phytoplankton. She hiked with Margaret McCarter, when Margaret was teaching at Clatsop Community College, and later taught stewardship classes for Washington Cooperative Extension and Clatsop Community College, was a Fellow with Ecotrust, Portland, Oregon, and Science Program Director for the Willapa Alliance, South Bend, Washington. Since 1998 she has been Science Officer for ShoreBank Pacific in Ilwaco, developing sustainability assessment methods, and working with clients to improve energy and materials efficiency. She also does wetland delineations, monitoring, and ecological surveys. Sayce lives on Willapa Bay north of Nahcotta, Washington, and in her spare time, hikes, botanizes new locations, and grows native plants (geophytes and Pacifica iris are favorites).

Book Reviews

Conifers of the World: the complete reference

Eckenwalder, J.E. 2009. Portland (OR): Timber Press. 720 pp. 67 color photos, 295 b/w photos, 240 line drawings, 67 distribution maps. ISBN 13:978-0-88192-974-4 $59.95 hardcover.



From the frontispiece photo of Port Orford cedar (*Chamaecyparis lawsoniana*) onward, you can tell that James Eckenwalder has roots in Oregon, having earned his undergraduate degree at Reed College in Portland. For his senior thesis there, he investigated the relationships of Alaska yellow cedar, Port Orford cedar, and other cypresses with redwood trees and their relatives; he proposed a classification that placed all of them in a single family. His proposal was subsequently tested and generally adopted, thus becoming one of many factors that precipitated a cascade of name changes in conifers. That the author has been researching conifers for more than three decades also becomes apparent in his empathy for readers who lament the loss of familiar botanical names of conifers commonly used by gardeners, botanists and foresters.

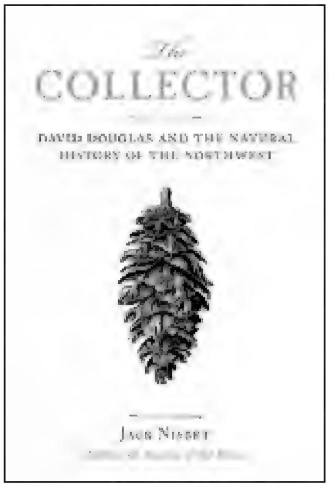
The first seven chapters (76 pages) are more-or-less introductory material, including conifer classification, nomenclature, where the various genera and species were discovered, conifers in nature and in the garden, morphology, paleobotany and evolution, and conifer identification. There are 67 plates of color photos following chapter 5; the remainder of the illustrations in the book are line drawings or black/white photos. The bulk of the book (555 pages) is an encyclopedic reference to conifers around the world, from *Abies* to *Wollemia*. In his attempt to give equal emphasis to all taxa, conifers of western North America necessarily receive sparser coverage than in regional treatments. At the back of the book, there are four appendices (conversion tables, authorities for scientific names, lists of conifers with distinctive features, and new names), an extensive glossary of terms, a bibliography, and a comprehensive index. For the most part, one won't need the glossary because the author avoids technical jargon. Even though he is clearly passionate about conifers, this doesn't blind him. About Leyland cypress, he writes, "They are so widely planted…and often in such inappropriate places considering their stature, that they border on pest status and have sparked many neighborly disputes."

This book provides a major fix for conifer junkies, whether they're planning some international travel or exploring a local arboretum or nursery, there is something here on everything. It is impressive that Eckenwalder fit all of it into a single volume. From the visual standpoint, my only suggestion is that more illustrations and photographs be included to provide the reader with a more comprehensive view of all of the conifers, especially the rare taxa. A complementary book, *Conifers Around the World*, a two-volume set by Zsolt Debreczy and István Rácz will cover all of the 520 conifer species with three to five color shots per plant. The major difference in the conifer books is price; the latter book, still in press, is slated to cost about $259. I can only congratulate the author for a passionately written, authoritatively organized book, and suggest it is a best buy. Order yours today from Timber Press for a plethora of conifer knowledge and some interesting insights from the author.

–Frank Callahan, Siskiyou Chapter.

The Collector: David Douglas and the Natural History of the Northwest

Nisbet, J. 2009. Seattle (WA): Sasquatch Books. 290 pp. ISBN 978-1-57061-613-6 $23.95 hardcover.



Time after time this year, the name David Douglas kept reappearing in my life. I was first attracted to the book cover adorned with a single cone of Douglas fir in a bookstore display as I was passing through the Seattle-Tacoma airport in January. I recognized the author's name, having previously read his biography of David Thompson (*Sources of the River*). Within a month, Jim Locklear sent his Plant of the Year article on Columbia phlox (*Phlox douglasii*). Soon after my mother gave me a clipping from her local newspaper about a book signing by Jack Nisbet, Kathleen Sayce's Swala-lahos article arrived, listing David Douglas among the early botanical explorers. By this time, I knew I had to read *The Collector*.

Of some authors, one might ask, "Sure, he's a historian, but can he tell a story?" Not Jack Nisbet. This story of David Douglas's life reads like a novel, flowing seamlessly from narrative into quote back into narrative without jarring the reader into noticing that Nisbet has woven a story from fragments of history recorded in letters and journals. The author appears to have transported himself back in time to see our world as this intrepid explorer saw it. This is not a coincidence. During his last two years of research for the book, Nisbet used Douglas's journal to revisit numerous sites during the same week of the year that Douglas had visited them. He was astonished to find that many places still had characteristics that Douglas described in his journal.

There are only a few illustrations: the single professional portrait of David Douglas (by artist Daniel Mcnee), a short-horned lizard and a sagebrush buttercup; five maps help the reader trace Douglas's journeys from 1824 through 1834. But the book doesn't need illustrations. The author paints with words so vividly that you picture each adventure and plant as if you were there yourself.

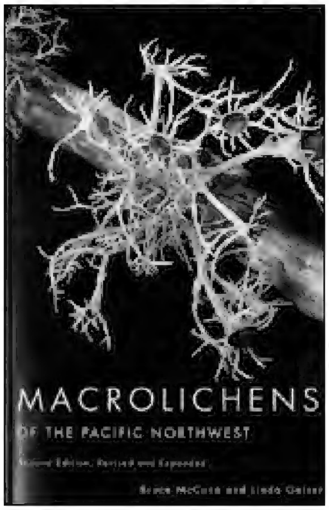
As the author is a naturalist and historian, the slant in this biography is not the plants that David Douglas was sent to collect for Britain's horticultural elite, but about the explorer's fascination with all the wonders he encountered in this new world. He tells how Douglas must have learned the details of the various ways the Indigenous people used the native plants, and about the biology of condors, lizards and grouse, among other creatures. There is the story revealed slowly, in tiny clues, of Douglas's fascination with gigantic pine cones traded north to the Willamette Valley, which he eventually traced to their source in the Umpqua country. And, there is the speculation of Douglas's love child from his time in the Colville Valley, backed by recipes for lichen cakes and baked *Missouii*.

This year Jack Nisbet was honored with the Pacific Northwest Book Award for *The Collector*, as one of the top books of 2009 written by a Northwest author. *The Collector* is due out in paperback this fall. Either version, this is a book you will want to own and read. If you loan it to your friends, first write your name on it, in ink.

–Cindy Roché, Siskiyou Chapter

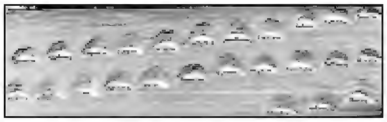
Macrolichens of the Pacific Northwest, Second Edition

McCune, B. and Geiser, L. 2009. Corvallis (OR): Oregon State University Press. 504 pp. ISBN 978-0-87071-565-5, color photos, bibliography, illustrated glossary, index. $30, paperback.


MACROLICHENS
OF THE PACIFIC NORTHWEST
Second Edition, Revised and Expanded
Bruce McCune and Linda Geiser

The appearance of the first edition (1997) of Bruce McCune and Linda Geiser's *Macrolichens of the Pacific Northwest* made it possible for the average botanist to identify most of our regional lichens confidently for the first time. Prior to its publication it was necessary to maintain a large shelf of literature to do this kind of task and, even then, it was still necessary to turn to experts for guidance and verification.

For people like me, *Macrolichens of the Pacific Northwest* was a life-changing book. Having it at hand meant I could realistically undertake inventory projects that included lichens along with bryophytes. Regional coverage was complete, the keys well written, the descriptions clear and thorough. What made this book special was the extensive use of the macro-photographs by Sylvia and Steve Sharnoff. Because of the variety of distinctive form and color, lichens are better suited to visual identification with quality photographs than most plants. The Sharnoff pictures have become world renowned for their high standard of quality. Only the 2001 book, *Lichens of North America* by I. Brodo and the Sharnoffs, has more of their pictures.

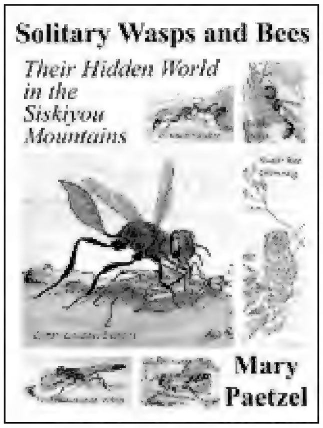


The second edition builds on the excellence of the first edition. All the wonderful Sharnoff pictures are present, with additional images supplied by local botanists. These photos are supplemented by high magnification pictures of critical structures, contributed mainly by Bruce McCune. Thanks in large part to these images, the number of illustrations in the second edition increased from 236 to 417. The scale bar in these pictures is not indicated; it is 1 millimeter unless otherwise noted. Close up pictures clarify the difficult genera *Peltigera, Umbilicaria,* and *Usnea*. The treatment of the latter genus is especially welcome as it has always been agonizingly difficult for everybody. It is still a difficult group to work with but, as a friend has said, at least now it seems worth trying to key out an *Usnea*.

The total coverage has increased by the addition of 117 species to the nearly 500 covered previously, many newly described. As before, only the most common or prominent have full descriptions and illustrations. The selection of these is admirably done. The taxonomy is fairly conservative, with only a half dozen or so generic segregates not recognized in the previous edition. One of my few complaints is that it is necessary to refer to the "Nomenclature" section in the back of the book to get the authors of names. I will be thumb indexing this edition, just as I did the previous one, because it will get that much use. *–David Wagner, Emerald Chapter*

Solitary Wasps and Bees: their Hidden World in the Siskiyou Mountains

Paetzel, M. 2010. Lulu books, Lulu.com. (published posthumously; edited by J. Levinson and L. Webb) 173 pp. ISBN 978-0-557-36970-6. $56.20 paper.



At long last, Mary Paetzel's book about solitary wasps and bees in the Siskiyou Mountains has been published. Janet Levinson worked with Mary for over a year to get the manuscript in shape, and we have gone through several edits in the years since Mary died in 2007. We published Mary's book through Lulu.com, an on-demand printing operation that is accessed through the internet.

Dr. Neal Evenhuis, an entomologist at the Bishop Natural History Museum in Honolulu, HI, received a copy of Mary's book from his sister Kitty, who lives in Grants Pass. Neal wrote to his sister: "What a great surprise! That is a GREAT book! I have told so many people that if I had all the time and money, I'd just lie on my belly and watch biology and write about it. Mary DID IT! I am so jealous. What a truly marvelous book to read and I love the drawings and paintings. The book would not be half as good without them. Thank you SO much! I will not put it down until I've finished reading it. So many of those little bees and wasps have been the subjects of my own observations when in the field, so I will be thrilled to read what she concluded when I could only guess at what they were doing."

This book is a fascinating collection of Mary's anecdotes of the wild Siskiyou Mountains, her meticulous field notes, wonderful drawings, and observations of the tiny creatures we so often overlook. If you enjoyed *Spirit of the Siskiyous: The Journals of a Mountain Naturalist*, you will want this book, too. Although not inexpensive ($56), the book is filled with Mary's colorful drawings from nature, and its contents are well worth the cost. Order Mary's book through Lulu.com, under ID#8501673. As an alternative to the paper copy, the book can also be downloaded as a PDF (portable document file) from Lulu.com for $10. If you are not internet-savvy, give me a call at 541-479-6859, and I will ship you a copy.

–Lee Webb, Siskiyou Chapter

Fellows Award

Stu Garrett

Photo by Robert Korfhage.

Physicians as botanists were common in the early exploration of the Northwest, including George Engelmann, Archibald Menzies, William Fraser Tolmie, William Tennant Gairdner, and John Strong Newberry. Bend physician Stu Garrett carries on this physician-naturalist tradition, not exploring and reporting new species, but conserving Oregon's native flora. It is particularly fitting that Garrett worked for protection and management of the Newberry Crater, which was named for Dr. John Strong Newberry, physician-naturalist on the 1855 Topographic Corps Expedition that mapped future railroad routes.

Stu Garrett first became acquainted with the Native Plant Society of Oregon (NPSO) in Portland during his family medicine internship at the University of Oregon Medical School (now OHSU) in 1976. He read in the *Oregonian* that Ruth Hansen was leading a hike to the Columbia River Gorge to look at wildflowers. All were welcome. He was astounded at the energy and stamina of the 70-year-old trip leader as she bounded up the steep trails in the Gorge, identifying all of the flora on the way up. By the end of the hike, he was convinced that he wanted to be involved with this group of people.

When Stu moved to Bend, he was interested in organizing a similar group in Central Oregon. Unbeknownst to him, Joyce Bork had the same idea. (When NPSO was formed in 1961, there were no regional chapters, only a state-wide group centered in Portland.) The two plant lovers soon connected and co-founded the Central Oregon Chapter in 1979. Stu took on the positions of Fieldtrip Chairman and Conservation Committee Chair, leading numerous fieldtrips and avidly pursuing the protection of rare plants in central Oregon. He served as chapter president for over ten years and was a mainstay of organizing fieldtrips and meetings, including two state annual meetings. Stu served as President of the NPSO State Board in 1989 and 1990. He instituted the swearing in of the NPSO President on a volume of Hitchcock with an appropriate tongue-in-cheek oath of office. But, the accomplishment that gave him the most satisfaction during his tenure was the initiation of NPSO's annual journal, *Kalmiopsis,* in 1991. He served on its editorial board for ten years (1991 through 2002). He wrote two Plant of the Year articles: Western juniper (*Juniperus occidentalis*) in 1995 and basin wildrye (*Leymus cinereus*) in 2002, and was co-author with Berta Youtie of an Oregon Plants and Places article in 1992: The Painted Hills, Thirty Million Years of Phytogeography. He served on the State Board of Directors for many years between 1980 and 2002.

Stu's interest in native plant communities let to involvement with the Oregon chapter of The Nature Conservancy and he eventually served on their Board for sixteen years. He has been a relentless force for control or eradication of weeds in central Oregon and has led and sponsored weed pulls and educational forums.

He has been involved with endeavors to protect Peck's penstemon (*Penstemon peckii*) in the Sisters area. He has encouraged the US Fish and Wildlife Service to increase protection for and reintroduction of the Malheur wirelettuce (*Stephanomeria malheurensis*). His concern for protecting the rare pumice grapefern (*Botrychium pumicola*) led to his involvement in creating the Newberry National Volcanic Monument. He was chairman of the citizen's committee that successfully sought Congressional designation of the Monument and was the Governor's appointee and chairman of the Citizens Advisory Committee for the Monument. He is the author of *The Newberry National Volcanic Monument: An Oregon Documentary* and has written on numerous other historical and natural topics. He has led natural history field trips for the High Desert Museum, The Nature Conservancy, NPSO, the Sierra Club, and a variety of other regional and statewide groups. In 2003 he was declared an "Earth Hero" by the Central Oregon Environmental Center, an annual award to an Oregonian for contributions to Oregon's environment. In 2003 he won the Donald Kerr Award from the High Desert Museum for volunteer efforts to conserve Oregon's High Desert ecosystems.

Stu has worked tirelessly in serving the medical as well as the environmental community. Professional activities have included President of the Central Oregon Medical Society, Chair of the St. Charles Medical Center Credentials Committee, and Vice-Chair of the Deschutes County Commission on Children and Families. He was named Oregon's Doctor-Citizen of the Year by the Oregon Medical Association in 1991 and Bend's Citizen of the Year in 1990 by the Bend Chamber of Commerce. He is the father of a daughter, Ragan, who attends the Oregon State University School of Veterinary Medicine. He is married to Hilary Garrett, a physical therapist in Bend.

NATIVE PLANT SOCIETY OF OREGON

STATE OFFICERS

Directors (to 6/12) Rhoda Love, Lisa Blackburn, Esther McEvoy
Directors (to 6/11) Celeste Coulter, Dan Luoma, Billy Don Robinson

President	David Lebo
Immediate Past President	Kelli Van Norman
Vice President	Judi Sanders
Secretary	David Barts
Treasurer	Cyndi Dion

STATE COMMITTEE CHAIRS

Budgets and Grants	Dan Luoma
Conservation, East Side	Duncan Thomas
Conservation, West Side	David Lebo
Friends of OR Flora Project	Linda Hardison
Legislative	Les Helgeson
Membership	Clayton Gautier
Rare & Endangered Plants	Les Gottlieb

CHAPTER PRESIDENTS

Blue Mountain (Pendleton)	Jerry Baker
Cheahmill	Susan Aldrich-Markham
Corvallis	Laurel Moulton
Emerald (Eugene)	Brian Basor
High Desert (Bend)	Eileen Obermiller
Klamath Basin	Sarah Malaby
Mid-Columbia	Sara Wu
North Coast	Janet Stahl
Portland	Don Jacobson
Siskiyou	Frank Callahan
Umpqua Valley (Roseburg)	Donna Rawson
Willamette Valley (Salem)	John Savage
WmCusick (LaGrande)	Jenifer Ferriel

PUBLICATIONS

Bulletin Editor/Producer	Taya Cummins/Jocelyn Duffy
Kalmiopsis Editor	Cindy Roché

NOTICE TO CONTRIBUTORS

Members of the Native Plant Society of Oregon and others are invited to submit articles, book reviews, artwork, and photographs for publication in *Kalmiopsis*. All materials submitted should pertain to Oregon's native vegetation and flora. Acceptance will be based on suitability (articles dealing with formal nomenclatural proposals or of a highly technical nature are not acceptable). *Kalmiopsis* publishes two series articles: *Plant of the Year*, and *Oregon Plants, Oregon Places*. We also publish articles about botanical history and features related to native plants or plant communities in Oregon.

Please consider that the readers of *Kalmiopsis* are people with varied educational backgrounds and all articles must be comprehensible to a broad, but relatively well educated, audience. The goals of *Kalmiopsis* are to disseminate correct information about and generate interest in native plants, thus each article is reviewed by the editorial board and selected technical reviewers before publication.

Contributions of artwork and photographs without accompanying manuscripts are welcome; color submissions must be suitable for publication in grayscale. Contact the *Kalmiopsis* editor to request a copy of Instructions to Authors, or to inquire about the suitability of an idea for an article.

CONTACT INFORMATION

Kalmiopsis Editor: Cindy Roché, P.O. Box 808, Talent, OR 97540-0808, kalmiopsis@NPSOregon.org
Bulletin Editor: Taya Cummins, bulletin@NPSOregon.org
Membership Chair: Clayton Gautier, 3927 Shasta View St., Eugene, OR 97405-4442, membership@NPSOregon.org
Webmaster: Norm Jensen, webmaster@NPSOregon.org
Website: http://www.NPSOregon.org
Email Discussion List Login: See NPSO website, select subscribe to list under membership.

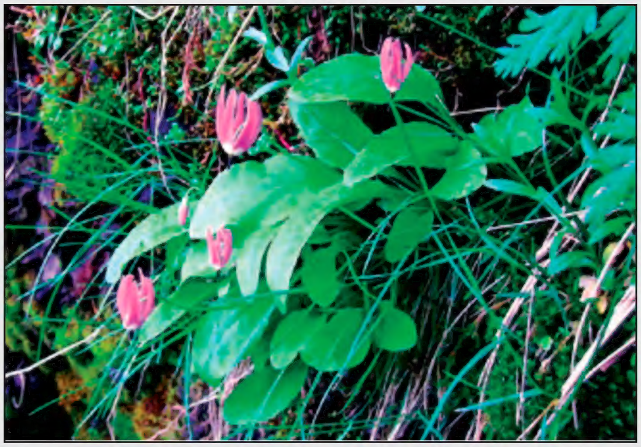
MEMBERSHIP

Membership in the Native Plant Society of Oregon is open to all.
Membership applications, renewals, and changes of address (include old address and zip code) should be sent to the NPSO Membership Chair, Clayton Gautier, 3927 Shasta View St., Eugene OR 97405-4442.
Student $12; Regular $18; Family $24; Sustaining $50; Patron $100; Life Member $500;
Subscription Only (Bulletin and Kalmiopsis) $18

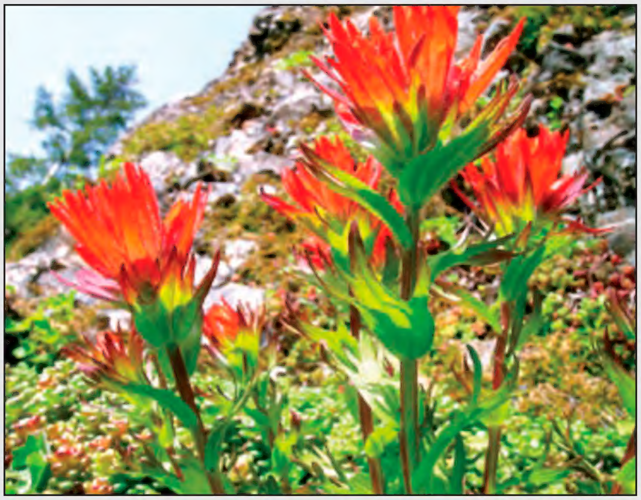
The opinions expressed by the authors do not necessarily reflect those of the Native Plant Society of Oregon.

ACKNOWLEDGEMENTS

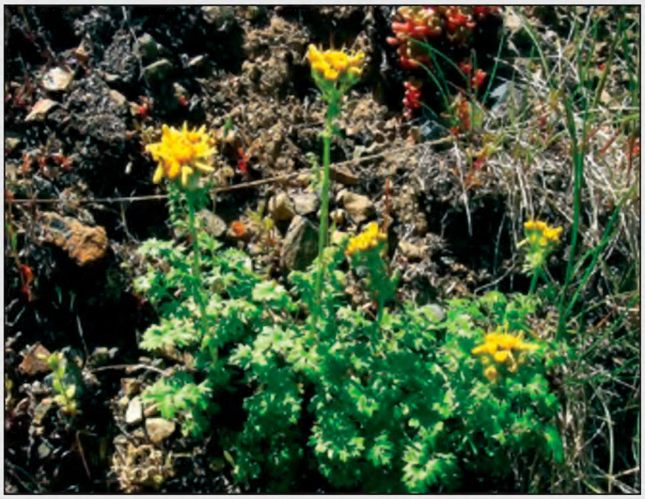
Kalmiopsis Logo: Linda Ann Vorobik (VorobikBotanicalArt.com)
Graphic Composition: Fassler Graphics, Ashland
Printing: Independent Printing Co., Ashland



Frigid shooting-star (*Dodecatheon austrofrigidum*) was described by Ken Chambers in 2006 from specimens collected in Tillamook County. Photo by Kathleen Sayce on Saddle Mountain.



Oregon botanist Dr. Kenton Chambers discovered Chambers' paintbrush (*Castilleja chambersii*) on Onion Peak and Sugarloaf Mountain in the early 1970s. Photo by Kathleen Sayce on Angora Peak, the type location.



Flett's groundsel (*Packera flettii*, formerly *Senecio flettii*) has a limited distribution in the Coast Range, Willapa Hills and Olympics. Curiously, it has not been seen on Saddle Mountain. Photo by K. Sayce on Angora Peak.

Hurwal Divide and Upper Lake Creek Basin. Records indicate that Georgia Mason collected the paintbrush *Castilleja chrysantha* in this area in 1964. Five years later, she returned to the Frances Lake Trail on June 29 to collect species of *Arabis* and *Saxifraga*. Photo by Ed Alverson.

Kalmiopsis
Native Plant Society of Oregon
Clayton Gautier, Membership Chair
3927 Shasta View St
Eugene OR 97405-4442

NONPROFIT ORG
US POSTAGE
PAID
MEDFORD OR
Permit No. 348

~ Native Plant Society of Oregon ~

Dedicated to the enjoyment, conservation, and study of Oregon's native plants and habitats.

Member of EarthShare Oregon

TABLE OF CONTENTS

Phlox douglasii. Photo by Robert Korfhage.

PLANT OF THE YEAR:
Columbia Phlox (*Phlox douglasii* Hook) 1
By James Locklear

Georgia Mason:
Eleven Summers Alone in the Wallowas 9
By Rhoda M. Love

Mountain gentian (*Gentiana calycosa*) in the Lostine Valley. Photo by Tanya Harvey.

Saddle Mountain. Photo by Kathleen Sayce.

OREGON PLANTS, OREGON PLACES:
Botanizing in the Swala-lahos Floristic Area 17
By Kathleen Sayce

Book Reviews 29

NPSO Fellow 31